A STUDY ON COST-BENEFIT ANALYSIS OF NURSERY RAISING OF SELECTED HORTICULTURAL CROPS IN RAJNANDGAON DISTRICT OFCHHATTISGARH

M.Sc. (Ag.) Thesis

by

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DEPARTMENT OF AGRICULTURAL ECONOMICS
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INDIRA GANDHI KRISHI VISHWAVIDYALAYA
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Submitted to the

Indira Gandhi KrishiVishwavidyalaya, Raipur

by

BHUPENDRA KUMAR

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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In

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CERTIFICATE – I

This is to certify that the thesis entitled **"A study on cost-benefit analysis of Nursery Raising of selected horticultural crops in Rajnandgaon district of Chhattisgarh"** submitted in partial fulfillment of the requirements for the degree of **Master of Science in Agriculture** of the Indira Gandhi Krishi Vishwavidyalaya, Raipur, is a record of the bonafide research work carried out by **Bhupendra Kumar** under my guidance and supervision. The subject of the thesis has been approved by the student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma or has been published/published part has been fully acknowledged. All the assistance and help received during the course of investigation have been duly acknowledged by her.

Date: 09/11/2018

Chairman
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THESIS APPROVED BY THE STUDENT'S ADVISORY COMMITTEE

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Member (Dr. A. K. Koshta) .....

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Member (Dr. Shishir Prakash Sharma) .....

CERTIFICATE - II

This is to certify that the thesis entitled **"A study on cost-benefit analysis of Nursery Raising of selected horticultural crops in Rajnandgaon district of Chhattisgarh"** submitted by **Bhupendra Kumar** to the Indira Gandhi Krishi Vishwavidyalaya, Raipur, in partial fulfillment of the requirements for the degree of **Master of Science in Agriculture** in Department of Agricultural Economics has been approved by the external examiner and student's Advisory Committee after the oral examination.

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Approved/Not approved

Director of Instructions .....

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LIST OF ABBREVIATIONS

ha.	Hectare
Rs.	Rupees
i.e.	That is
Kg.	Kilogoram
Viz.,	Namely
FYM	Farm Yard Manure
Fig.	Figure
%	Percent

THESIS ABSTRACT

a)	Title of the thesis	:	"A study on cost-benefit analysis of Nursery Raising of selected horticultural crops in Rajnandgaon district of Chhattisgarh"
b)	Full name of the student	:	Bhupendra Kumar
c)	Name and address of the major advisor	:	Dr. Sushila (Assistant Professor) Department of Agricultural Economics Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.)
d)	Degree to be awarded	:	M.Sc. (Ag.) Agricultural Economics
e)	Year of award of degree	:	2018
f)	Major subject	:	Agricultural Economics

Signature of Student

Signature of Major Advisor

Signature Head of Department

Date: 09 / 11 / 2018

ABSTRACT

An attempt has been made to undertaken **"A study on cost-benefit analysis of Nursery Raising of selected horticultural crops in Rajnandgaon district of Chhattisgarh"**. The specific objectives of the study were. 1. To work out the cost benefit analysis of the nursery raising of selected horticultural crops. 2. To estimate the marketing cost, marketing margin and efficiency in marketing of planting material of selected horticultural crops. 3. To find out the constraints in nursery raising of selected horticultural crops and suggest suitable measures to overcome them. The study was conducted in Out of 27 districts of Chhattisgarh,

Rajnandgaon district was selected purposively. Rajnandgaon district has 9 blocks namely- Chhuikhadan, Khairagarh, Dongargarh, Rajnandgaon, Dongargaon, Chhuriya, Mohla, Manpur and AmbagarhChowki.Tomato in vegetable crops tomato and among the spices chilli were selected for studying economic analysis of nursery raiser of these crops while among the fruit crops papaya was selected for economic analysis of nursery raiser because there is private nursery only for papaya.The study will require both primary and secondary data. Primary data related to cost and return and various constraints in nursery raising has been collected through personal interview method on pre tested well structured schedule. Secondary data regarding area and production of horticultural crops has been collected from official recordsof Deputy Director of Horticulture and Senior Horticulture Development OfficerRajnandgaonoffices. Geographical data of district and block has been collected from the records maintained by district and block government offices.The profitability in tomato seedlings was estimated it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of tomato seedlings in open field was profitable.The profitability in tomato seedlings was estimated it was found that input-output ratio was 1:2.97 while benefit-cost ratio was 1:1.97 respectively,indicating that raising of tomato seedlings in temporary shade net was more profitability than open field nursery. The profitability in chilli seedlings was estimated it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of chilli seedlings in open field was profitable. The profitability in chilliseedlings was estimated it was found that input-output ratio was 1:3.10 while benefit cost ratio was 1:2.10 respectively, indicating that raising of chilli seedlings in temporary shade net was profitability than open field Nursery. The profitability in papaya seedlings was estimated it was found that input-output ratio was 1:3.92 while benefit-cost ratio was 1:2.92 respectively, indicating that raising of papaya seedlings in temporary shade net was profitable. It was observed that in the study area there, were three types of marketing channel for seedlings of tomato, chilli and papaya was found. Marketing cost of tomato seedlings in channel –I i.e. from nursery raiser to crop grower of seedlings sold at same village was 1:210₹. Marketing cost of chilli

seedlings of temporary shade net type nursery in channel –I i.e. from nursery raiser to crop grower of seedlings sold at same village was 760₹. Marketing cost of papaya seedlings of temporary shade net type nursery in channel – III i.e. from nursery raiser to crop grower of seedling sold at other district was 1370₹.Governments should provide subsidies to nursery raiser in order to overcome the high price of seed.Timely training programme should be conducted by government horticulture departments and other organization to nursery raiser. So that, their technical skill can be improved. The shortage of labour can be minimize by introducing labour replacing machine nursery raising.Proper disposal centre for marketing of seedlings should be constructed at potential market like Rajnandgaonsabjimandi (APMC) so that cultivator can be easily purchase the seedlings from there and marketing of seedlings can be secure.To prevent losses of seedlings which was caused by insect-pest and diseases seed and nursery bed should be properly treated and timely sowing of seeds is also encouraged.Proper drainage system should be maintained in the nursery in order to reduced the mortality of the seedlings which in turn will generate more profit to nursery raising. Using the green house for nursery raising similarly by adopting the timely sowing and irrigation practices, loss from climate uncertainty can be reduced. Inadequacy of capital in nursery raising can be fulfil by approaching the financial institution like co-operative bank for the financial support to meet their requirements. Adequate availability of capital will help the nursery raiser to carry out nursery raising business effective and profitably.

शोध सारांश

क)	शोध शीर्षक	:	''छत्तीसगढ़ के राजनांदगांव जिले में चयनित बागवानी फसलों की नर्सरी स्थापना के लागत लाभ विश्लेषण पर एक अध्ययन''
ख)	छात्र का पूरा नाम	:	भूपेंद्र कुमार
ग)	प्रमुख सलाहकार का नाम व पता	:	डॉ. सुशीला (सहायक प्राध्यापक) कृषि अर्थशास्त्र विभाग, इंदिरा गांधी कृषि विश्वविद्यालय, रायपुर (छ.ग.)
घ)	प्रदान किये जाने वाली उपाधि	:	एम.एस.सी. (कृषि) कृषि अर्थशास्त्र
ङ)	उपाधि के पुरस्कार का वर्ष	:	2018
च)	प्रमुख विषय	:	कृषि अर्थशास्त्र

छात्र के हस्ताक्षर

मुख्य सलाहकार के हस्ताक्षर

विभागाध्यक्ष के हस्ताक्षर

दिनांक : 09/11/2018

सारांश

छत्तीसगढ के राजनांदगांव जिले में चयनित बागवानी फसलों की बढ़ती नर्सरी के लागत–लाभ विश्लेषण पर एक अध्ययन करने के लिए एक प्रयास किया गया है। अध्ययन के विशिष्ट उद्देश्य थे।

1) चयनित बागवानी फसलों की नर्सरी बढ़ाने के लागत लाभ विश्लेषण का काम करने के लिए।

2) चयनित बागवानी फसलों की रोपण सामग्री के विपणन में विपणन लागत, विपणन मार्जिन और दक्षता का अनुमान लगाने के लिए।

3) चयनित बागवानी फसलों की नर्सरी बढ़ाने में बाधाओं का पता लगाने और उन्हें दूर करने के लिए उपयुक्त उपायों का सुझाव देना। छत्तीसगढ़ के 27 जिलों में से अध्ययन में आयोजित कयिा गया था, राजनांदगाव जिले को बागवानी फसलों के क्षेत्र व उत्पादन के आधार पर चुना गया था। राजनांदगांव जिले में 9 ब्लॉक हैं – छुईखदान, खैरागढ़,

डोंगरगढ़, राजनांदगांव, डोंगरगांव, छुरिया, मोहला, मानपुर और अंबागढ़ चौकी। सब्जी फसलों में टमाटर और मसालों में मिर्च इन फसलों के नर्सरी रायजर के आर्थिक विश्लेषण का अध्ययन करने के लिए चुने गए थे, जबकि फल फसलों में नर्सरी रायजर के आर्थिक विश्लेषण के लिए पपीता का चयन किया गया था क्योंकि केवल पपीता के लिए निजी नर्सरी है। अध्ययन के लिए प्राथमिक और माध्यमिक दोनों डेटा की आवश्यकता होगी। लागत और वापसी से संबंधित प्राथमिक डेटा और नर्सरी राइजिंग में विभिन्न बाधाओं को पूर्व परीक्षण अच्छी तरह से संरचित अनुसूची पर व्यक्तिगत साक्षात्कार विधि के माध्यम से एकत्रित किया गया है। बागवानी फसलों के क्षेत्र और उत्पादन के संबंध में माध्यमिक डेटा बागवानी के उप निदेशक और वरिष्ठ बागवानी विकास अधिकारी राजनांदगांव कार्यालयों के अधिकारिक रिकॉर्ड से एकत्रित किया गया है। जिला और ब्लॉक के भौगोलिक डेटा जिला और ब्लॉक सरकारी कार्यालयों द्वारा बनाए गए रिकॉर्ड से एकत्र किए गए हैं। टमाटर के रोपण में लाभप्रदता का अनुमान लगाया गया था कि यह पाया गया था कि इनपुट–आउटपुट अनुपात 1:2.08 था जबकि लाभ लागत अनुपात 1:1.08 था, जो दर्शाता है कि खुले मैदान में टमाटर के रोपण को लाभदायक था। टमाटर के रोपण में लाभप्रदता का अनुमान लगाया गया था कि यह पाया गया था कि इनपुट–आउटपुट अनुपात 1:2.97 था जबकि लाभ लागत अनुपात 1:1.97 था, जो दर्शाता है कि अस्थायी छाया नेट में टमाटर के रोपण को लगाने से खुले मैदान नर्सरी की तुलना में अधिक लाभप्रदता थी। मिर्च के रोपण में लाभप्रदता का अनुमान लगाया गया था कि यह पाया गया था कि इनपुट–आउटपुट अनुपात 1:2.08 था जबकि लाभ लागत अनुपात 1:1.08 था, जो दर्शाता है कि खुले मैदान में मिर्च के रोपण को लाभदायक था। मिर्च के रोपण में लाभप्रदता का अनुमान लगाया गया था कि यह पाया गया था कि इनपुट–आउटपुट अनुपात 1:3.10 था जबकि लाभ लागत अनुपात 1:2.10 था, जो दर्शाता है कि अस्थायी छाया नेट में मिर्च के रोपण को लगाने से खुले मैदान नर्सरी की तुलना में लाभप्रदता थी। पपीता रोपण में लाभप्रदता का अनुमान लगाया गया था कि यह पाया गया था कि इनपुट–आउटपुट अनुपात 1:3.92 था जबकि लाभ लागत अनुपात क्रमशः 1:2.92 था, जो दर्शाता है कि अस्थायी छाया नेट में पपीता रोपण लगाना लाभदायक था। यह देखा गया कि अध्ययन क्षेत्र में टमाटर, मिर्च और पपीता के रोपण के लिए तीन प्रकार के मार्केटिंग चैनल थे। चैनल में टमाटर के रोपण की विपणन लागत नर्सरी रायजर से उसी गांव में बेचे गए रोपण के फसल उत्पादक से 210 रूपये था। अस्थायी छाया के मिर्च के रोपण की विपणन लागत नेट प्रकार नर्सरी चैनल में नर्सरी रायजर से उसी गांव में बेचे गए रोपण के फसल उत्पादक से 760 रूपये था। अस्थायी छाया के पपीता रोपण की

विपणन लागत नेट प्रकार चैनल में नर्सरी – यानी नर्सरी रायजर से दूसरे जिले में बेची जाने वाली बीजिंग के फसल उत्पादक 1370 रूपये था। बीज की उच्च कीमत को दूर करने के लिए सरकारों को नर्सरी रायजर को अनुदान प्रदान करनी चाहिए। समय पर प्रशिक्षण कार्यक्रम सरकारी बागवानी विभागों और अन्य संगठन द्वारा नर्सरी रायजर द्वारा आयोजित किया जाना चाहिए। इसलिए उनके तकनीकी कौशल में सुधार किया जा सकता है। श्रम की कमी श्रम प्रतिस्थापन मशीन नर्सरी बढ़ाना शुरू करके कम किया जा सकता है। रोपण के विपणन के लिए उचित विपणन केंद्र का निर्माण राजनांदगांव सब्जी मंडी (एपीएमसी) जैसे संभावित बाजार में किया जाना चाहिए ताकि किसान आसानी से वहां से रोपण खरीद सकें और रोपण का विपणन सुरक्षित हो सके। कीट–कीट और बीमारियों के कारणहोने वाले रोपण के नुकसान को रोकने के लिए बीज और नर्सरी बिस्तर का उचित इलाज किया जाना चाहिए और बीज की समय पर बुवाई भी प्रोत्साहित की जाती है। रोपण की मृत्यु दर को कम करने के लिए नर्सरी में उचित जल निकासी व्यवस्था को बनाए रखा जाना चाहिए जिससे बदले में नर्सरी बढ़ने के लिए अधिक लाभ मिलेगा। नर्सरी के लिए ग्रीन हाउस का उपयोग समय पर बुवाई और सिंचाई प्रथाओं को अपनाकर जलवायु अनिश्चितता से होने वाली हानि को कम किया जा सकता है। नर्सरी राइजिंग में पूंजी की अपर्याप्तता को वित्तीय आवश्यकताओं के लिए सहकारी बैंक जैसे वित्तीय आवश्यकताओं के लिए अपनी आवश्यकताओं को पूरा करने के लिए पूरा किया जा सकता है। पूंजी की पर्याप्त उपलब्धता नर्सरी बढ़ने में मदद करेगी।

CHAPTER-I

INTRODUCTION

1.1 Background

A nursery is a managed site, designed to produce seedlings grown under favourable condition until they are ready for planting. All nurseries primarily aim to produce sufficient quantities of high quality seedlings to satisfy the needs of users. Plant propagation techniques and practices are the core of horticulture nurseries. Product from nursery which is used for cultivation is known in different terms *viz;* seedlings, planting material, plantlets *etc*.

Requirement of horticultural products in our daily diet has been increasing due to change in consumption pattern and life style which creates higher demand of fruits, vegetables and other horticultural crops in market. Current economic survey 2015-16 shows 2.7 per cent increase in area of horticulture crops while increase in products are by 7 per cent and percentage share of horticulture output in agriculture is more than 33 per cent. In agriculture GDP contribution of fruits and vegetables are 10 and 14 per cent, respectively. Fruit, vegetable, spices and flower are the main crops of horticulture, which are mainly grown by transplanting method for which nursery is required.

Nursery is consequently the basic need of horticulture. Plant propagation techniques and practices is the core of horticulture nurseries. The planting materials for horticultural plantations are raised from seeds and vegetative parts. Role of mother plants is very primary and important. The fate of nursery depends on quality and truthfulness of mother plants. A good nursery entrepreneur does not depend on others for procurement of mother plants. Mother plants are required for both stock and scion. Mother plants

should be selected on the basis of its genetic traits and other factors like availability and adaptation in the growing environment.

1.2 Importance of plant nursery raising of horticultural crops

Seedlings and grafts are produced in nursery and the fruit orchards and ornamental gardens can be established with minimum care, cost and maintenance. The nursery planting materials are available at the beginning of the planting season. This saves the time, money and efforts of the farmers to raise seedlings. There is a wide scope for fruit orchards, ornamental, vegetable, and landscape gardens at public gardens, highways and co-operative housing societies. The area being small and compact, it is convenient and easy to grow large number of seedlings per unit area. Help in better utilization of land. It is the only way to obtain desirable type of plants. Ensure easy and cheap availability of plants.

1.3 Scope of nursery raising of horticultural crops

Most of the horticultural plants, particularly the fruit trees, are perennial in nature. Some of the fruit trees survive and produce fruits for about 100 years. Horticulture has a significant role in human nutrition. It plays a prime role in wealth generation and socio - economic status of the farmers. Most of the horticultural crops are propagated vegetatively for which nursery units are necessary. There are plentiful programs being implemented to develop the nurseries and there by bringing about horticultural development.

1.4 Justification of the study

In Rajnandgaon district the are production of tomato, chilli and papaya are much higher than other district of the state. So in Rajnandgaon district nursery raising of these crops have much more scope than other district of the state. Nursery raising and Rajnandgaon district have a better scope as well as much fruitful for nursery raiser. Looking to the above importance, scope and fruitfulness of nursery raising Rajnandgaon district.‘‘A study on cost-benefit analysis of Nursery Raising of selected

horticultural crops in Rajnandgaon district of Chhattisgarh '' Hence, the above topic was selected for the present study.

1.5 The specific objectives of the study are

1. To work out the cost benefit analysis of the nursery raising of selected horticultural crops.
2. To estimate the marketing cost, marketing margin and efficiency in marketing of planting material of selected horticultural crops.
3. To find out the constraints in nursery raising of selected horticultural crops and suggest suitable measures to overcome them.

CHAPTER- II

REVIEW OF LITERATURE

In this chapter, an attempt has been made to review of pertinent literature keeping in view the problem entitled, ‘‘A study on cost-benefit analysis of Nursery Raising of selected horticultural crops in Rajnandgaon district of Chhattisgarh’’. A brief account of the work reported by the past researchers has been discussed in below.

A brief resume of work done in India and abroad

Patil and Kulkarni (1990) estimated the cost and margins in marketing of sorghum in two different and imported markets in Karnataka (Bijapur and Bagalkot) and revealed variations in the costs incurred by different size groups of farmers in and between the selected markets. The commission charged by commission agents was found to constitute a major proportion of the total costs incurred by the farmers irrespective of the size groups to which they belonged or the market. The transportation cost and storage cost constituted other important items of marketing costs. Expenses like packing, loading and unloading, weighing charges were of little significance. The average cost incurred by wholesalers was Rs. 12.40 per quintal in Bijapur market 11.87 in Bagalkot market. A major proportion of this cost was for transport. The difference between the consumer price and the price received by farmers varied between different size groups of farmers. The producer received about 75 per cent of the actual price paid by the consumer.

Shiyani RL and Kakadia BH (1998) studied the costs and returns of garlic reduction was conducted in 1997- 98 in Junagarh, Jamnagar and Rajkot districts, the three major garlic growing districts in Gujarat state, India. Total cost of garlic cultivation was Rs 56 588/ha of which, the operational cost was Rs 38511/ha Seed accounted for the highest share of total cost (23%) followed

by hired human labour, irrigation and chemicals. Average yield was 68.51 quintal/hac. resulting in a total cost of production of Rs 1290.79/quintal. Gross return was Rs 26185/hac. Average marketing cost of garlic was Rs 40.37/q and about 87% of the total garlic production was marketed.

Jain and Chetan (2002) studied the marketing of major horticulture crops in Dharsiwa Block of Raipur. The main objective of study was to identify the different marketing channels involved in marketing of fruits and vegetables, estimate the marketing cost and marketing margins in fruit and vegetable marketing and estimate the marketing efficiency prevailing in different marketing channel. The result of study showed that the area under horticulture crops increased at small and medium farm but decreased at large farm.

Hossain *et al.* (2002) The aim of paper is to estimate the costs and returns of cauliflower production; identify the domestic marketing channels; and determine the marketing margins. Four rounds of survey were conducted during December 1998-February 1999 among 176 commercial cauliflower growers and 447 market intermediaries in Bangladesh. The results show that although cauliflower requires a large amount of cash for its cultivation, growers can obtain a high amount of profit. Moreover, costs and returns vary from one locality to another. Among the different market intermediaries, local retailers get the most profit. Suggestions are presented to improve the existing marketing system for cauliflower.

Babu *et al.* (2003) conducted studied on Price Spread and Marketing of Green Chillies - A Case Study in Andhra Pradesh. It was clear from the study that the producer's shares in the consumer's rupee as well as marketing efficiency were high in the channel II, where there were no middlemen. But, the majority of the farmers were forced to dispose of their commodity to the village merchant who provided credit to them. The main problems associated with marketing of green chillies were, absence of cold storage structures, high transportation cost unawareness of market information, lack of support price and unsatisfactory marketing arrangements.

Based on the findings of the study, the policy implications which emerged out are (i) there is a need of installation of cold storage structures (ii) Proper market information should be made available to the farmers. For that, the extension agency should be strengthened (iii) Adequate and timely credit should be provided to the farmers. (iv) The government should give priority for the establishment and smooth functioning of regulated markets. (v) Production and marketing techniques have to be integrated to reduce postharvest losses and (vi) The government should provide a good support price for the produce.

Balappa and Hugas (2003) studied the Economic Evaluation of Onion Production and its Marketing System in Karnataka. In view of the major cost on labour, there was immediate need to develop the labour saving practices such as use of weedicides, improved tools for planting, harvesting, etc. Appropriate extension method may be adopted to evaluate the farmers on optimum use of inputs. Though the farmers are producing adequate quantity of onion to meet the consumer demand, they were facing problems in marketing of their produce. On the other hand, market intermediaries were accruing higher margin by incurring less cost and services. Therefore, in order to regulate the expenditure on commission, transportation and packing, efforts should be made to develop the necessary infra-structure for the marketing of onion in the state. Alternatively, it was suggested to develop the farmer's market for vegetables in general and onion in particular.

Jain and Tegar (2003) studied on economic of production and marketing of tomato in Jashpur district of Chhattisgarh. The study assures about profit level, cost of cultivation is measures that help the farmers to take rational decision about production. The analysis is divided into four categories marginal group (34 farmers), small group (24 farmers), and medium (14 farmers). The cropping intensity on various farm sizes is estimated to be 108.18 per cent, 111.15 per cent, 115.01 per cent and 118.38 per cent on marginal, small, medium and large farms respectively. The total cost is estimated by adding variable cost, fixed cost and marketing cost. It showed maximum cost at large farms while minimum at marginal firms. The total

marketing cost ranged from 19.87 per cent at marginal farm to 13.52 per cent at medium farms. Net return on various sizes of farms is examined as Rs.25317 per ha. at marginal, Rs.28022 per ha. at small, Rs.29987 per ha. at medium and Rs.52192 per ha. at large farms. The cost benefit ratio on large farms is observed to be highest among various sizes of farms. It is noted as 1:1.91, 1:1.98, 1:2.22 and 1:2.90 at marginal, small, medium and large farms respectively.

Birari *et al. (*2004) The paper attempts to study the channels, costs, margins and efficiency of marketing of cole vegetables (cabbage and cauliflower). A survey was conducted among 180 vegetable growers in western Maharashtra, India. Results shows that the most important channel in both the primary and terminal markets is the one involving a commission agent, a wholesaler and a retailer. Majority of the produce are sold in the terminal markets in both seasons (kharif and rabi) of the cole vegetables. The per quintal marketing cost for cabbage is highest in the terminal market during the rabi season (Rs. 70.49) and lowest in the primary market during the kharif season (Rs. 40.57), while the per quintal marketing cost for cauliflower is also highest in the terminal market during the rabi season (Rs. 72.57). The producers' share in consumer's rupee for cabbage was more than 50% in both markets, while that for cauliflower is higher in the primary market for both seasons. The marketing efficiency indices for both cabbage and cauliflower indicate that these vegetables are not marketed efficfently.

Verma (2004) reported the determines the costs, returns, profitability and resource use efficiency of garlic production. It also identifies the marketing channels for garlic in the district, and determines the marketing costs, margins and efficiency. Also examined are the compound growth rates of, and the relationship between, market arrivals and wholesale prices of garlic in the Indore Vegetable Mandi over the period 1997/98-2001/02. Finally, constraints in garlic production and marketing in the study area are identified, and measures for improvement are suggested.

Singh (2006) worked out the economics of production and marketing of vegetable in Madhya Pradesh, Indian institute of forest Publications, Bhopal. The main objectives of study marketable surplus, marketed surplus of vegetable and marketing cost and margin of vegetable, and it was concluded that the lower and backward strata of society were vegetable producer in the study area and the higher strata of respondent were not very interested in the vegetable production business.

Singh and Banafar (2006) have conducted a study on - An economic analysis of production and marketing of cauliflower in Durg District of C.G state. The main objective of study was to find out the cost of production, marketing channel and marketing efficiency. It was concluded that the average cost of cultivation of cauliflower per hectare was Rs.25228.57.lt showed a rising trend with the rise in the size of farm. It was due to the fact that the large farm could incur more expenditure on modern input. Average per hectare output was Rs.48i56.20. Average, per hectare benefit cost ratio (BCR) was estimated to 1:1.91. Slightly higher share i.e.85.91 percent and 80.15 percent in Shastri market, where it was 83.60 and 78.37 percent for the same vegetable respectively. Channel - II was found to be more efficient as compare to channel- I.

Ghumatkar *et al.* (2007) found that the most of farmer sold their produce through channel-I (Producer-wholesaler-retailer-consumer). The estimated per quintal marketing cost incurred by producer was Rs. 156.99. The major items of expenditure were transportation, commission charges and packing materials. The marketing cost incurred by village merchant was higher (Rs. 89.99) than that of wholesaler and retailer, while it was lowest for retailer than that of wholesaler and village merchant. The share of producer in consumer rupee was highest in channel-I followed by channel- III and channel II. The channel- IV (Producer - consumer) was the most beneficial in producer’s share in consumer’s rupee and was the highest (93.50%) than that of channel-I, II and III.

Gajbhiye *et al.* (2008) an economic analysis and postharvest losses of selected vegetables in Nagpur district, Maharashtra, India, was conducted to estimate marketing cost, marketing margin and price spread in vegetable marketing, and postharvest losses during marketing at different levels. Data on marketing cost, market margin, price spread and losses were collected from fifteen wholesalers and fifteen retailers from Nagpur vegetable market. The highest total marketing cost was observed in tomato (43.64%), followed by cabbage (35.31%), aubergine (32.07%), cauliflower (31.37%), okra (23.31%) and chilli (22.90%). The highest losses incurred during marketing were in tomato (35.0%), followed by cabbage, cauliflower and aubergine (15-20%), and lowest in okra and green chilli (6-9%).

Anonymous (2010) in research report submitted on estimation of marketing efficiency of horticultural commodities under different supply chains in India. Work out the market margin, market cost and price spread for horticulture crops. Total marketing cost for Potato, Tomato, Baby corn, Rose and Grape were ₹325.3,469,370,177 and 270 respectively similarly marketing margin of marketing channel of Potato, Tomato, Baby corn, Rose and Grape were 115.3,241,145,64 and 110 percent respectively.

Chaudhary (2010) studied the analysis of tomato marketing system in Ialitpur district Nepal. This study was carried out to analyze the marketing system of tomato in lalitpur district of Nepal during the year 2010. Specifically, this study was intended to identify marketing channel to estimate gross margin, marketing margin and producer share, to find out the situation of market information and to identify constraint related to production and marketing of vegetables especially tomato. Accordingly a representative sample size of 20 tomato growers comprising 10 each from lamatar and lubhu village development committees was purposively selected. In the marketing system the channel of producer wholesaler-retailer-consumer was most common where about 50 per cent tomato passed to consumer through this channel. The marketing margin was estimated to be Rs.20 per kg and produce share in the study area was 67 per cent, which was highest among chain factors.

Rajur *et al.* (2010) observed that there was a marginal difference in marketing costs incurred by the farmers among the various districts of Karnatak. The per quintal cost of marketing incurred by farmers in Raichur district (Rs. 112.65) was comparatively higher than that of Bijapur (Rs. 110.02) and Gulbarga (Rs.103.80) districts. The total cost incurred by village merchant was more than Gulbarga districts (Rs.106.10) followed by Bijapur districts (Rs.104.00) and Raichur (Rs. 102.70). The total cost incurred by commission agent was more in Raichur market followed by Gulbarga and Bijapur. The total cost incurred by wholesaler was more in Gulbarga compared to Bijapur and Raichur. The total cost incurred by retailers was highest in Bijapur (Rs.47.20) followed by Gulbarga (Rs.46.80) and Raichur (44.20). The village merchant was exploiting the farmers by way of taking more profit. They suggested that primary co-operative societies should be encouraged to arrange for sale of produce of its members in the regulated market through Taluka Agriculture Produce Co-operative Marketing Society (TAPCMS) through a system of pooling.

Rajput *et al.* (2010) suggested that adequate input facilities and timely supply of cheaper credit by the financing agencies to the producers, processors and traders would help in increasing the productivity as well as efficiency in the marketing of the produce. The result indicates that, price-spread of potato should be reduced to encourage the potato growers for selling to sell their produce through co-operative marketing societies. The potato based processing unit can play a significant role in fetching reasonable price rather than selling the potato as such in the market. To improve the marketing of potato cold storage facility should be extended at the farmer level on cheaper rates.

Hosamani *et.al. (*2011) carried out study the investment pattern in pomegranate orchard and to compute the costs and returns in pomegranate cultivation. The cost of establishment per ha was found to be ‘1,90,888.41 and ‘1,89,644.33 of which material cost constituted 56.87 and 58.15 per cent and maintenance cost 43.13 and 41.85 per cent. The average per hac. maintenance cost incurred by respondents was ₹82,320.70 during the first three years. The

labor cost accounted for 53.73, 24.59, and 21.68 per cent, respectively. The average per ha yield was 4.68 tones. Net returns obtained were 1,40,588.18 .The financial feasibility analysis revealed that on an average the investment in pomegranate orchards can be recovered within six years. The returns per rupee of investment in these orchards were capable of generating nearly three rupees which was highly profitable venture.

Joshi (2011) examined the marketed surplus and price spread of Brinjal in Western Uttar Pradesh. The study was undertaken to analyze marketed surplus and price spread for brinjal in Western Uttar Pradesh. Cluster sampling techniques was used to select the sample villages and respondents. Primary data were collected by personal interview of respondents. Simple statistical tools were employed to accomplish different objectives of the study. The marketed surplus of the medium category of farms have slightly higher surplus than marginal, large and small categories of farms. Their relative proportion was 94.84 per cent, 94.51 per cent, 94.49 per cent and 94.48 per cent respectively of the total production. The share of producer in consumer rupee was high in channel were there are less number of intermediaries. The marketing cost incurred by wholesaler in different channels were estimated 5.01 per cent,6.39 per cent and 7.88 per cent of the consumer price respectively and their corresponding net margins were 9.68 per cent, 9.61 per cent andl0.23 per cent of the price paid by the consumer.

Sangeetha and Banumathy (2011) conducted an economic analysis of marketing of major vegetables in Cuddalore district. The first hypothesis of the study was there exist a direct relationship between total marketing cost and the number of middlemen involved in the identified marketing channel. It was clear from the results that the total marketing cost of Tomato and Brinjal was observed as the highest in the marketing channel I. The second hypothesis of the study was current arrivals of vegetables is an important source of information for determining the current wholesale price, the producer's net price for tomato was 39.57 per cent,53.54 per cent and 93.87 per cent of consumer rupee in channel I, II and III respectively. In channel III, the farmers had more than 90 per cent of consumers' rupee. The modified

marketing efficiency index showed that in channel II, the index was greater than unity which indicated that the producers' net price was greater than marketing cost and margin. Though the producer's net price was low in channel III, the index was very high. It showed that the channel III where there was a direct contact between grower and consumer was the most efficient channel. The results that the producers had incurred an expenditure of Rs.3.71 per quintal of Brinjal and Rs.7.36 per quintal of tomato. It could also be seen that the cost of transportation constituted a major share (above 60 per cent) of the total cost of marketing i.e., Rs.2.5/quintal for Brinjal and Rs.4.60/quintal for tomato. Next to transportation cost, commission charges occupied the second position. More than 15 per cent of producers marketing cost were realized as the commission charge. the commission agent cum wholesaler incurred Rs.32.70/quintal and Rs.46.11/quintal as marketing cost for Brinjal and Tomato respectively. Transport constituted major share of total marketing cost. Secondly labour charge for cleaning occupied 32.41 per cent of total cost in Brinjal and 31.98 per cent of total cost in tomato. This might be due to bulk handling of produce and perishable nature of Brinjal and tomato which lead to wastage of produce. Hence, value of damaged/physical loss in Brinjal and tomato also occupied considerable percentage in total marketing cost. A glance of table 5 would indicate that the retailer incurred Rs.1.52 per quintal of Brinjal and Rs.3.52 per quintal of tomato as marketing cost. It should also be noted that the shop rent constituted a major share of (5o per cent) marketing cost both for Brinjal and tomato. Next to shop rent the wastage account for 46.05 per cent and 48.30 per cent of the marketing cost incurred by the retailer for Brinjal and tomato respectively.

Joshi (2012) analysed the marketed surplus and price spread of Okra in Western Uttar Pradesh, Cluster sampling techniques was used to select the sample villages and respondents. Primary data were collected by personal interview of respondents. Simple statistical tools were employed to accomplish different objectives of the study. The marketed surplus of the small category of farms had slightly higher surplus than large, marginal and medium categories of farms. Their relative proportion was 95.31 per cent,

94.88 per cent, 94.85 per cent and 92.76 percent respectively of the total production. The share of producer in consumer rupee was high in channel were there were less number of intermediaries. The marketing cost incurred by wholesaler in different channels were estimated 6.92 per cent,6.98 percent and 8.29 per cent of the consumer price respectively and their corresponding net margins were 9.76 per cent, 10.13 per cent and 12.78 per cent of the price paid by the consumer.

Bajkani *et.al. (*2013) studied an Economic Analysis Cost of Production of Major Vegetables in districts Loralai, Bolan and Killa Saifullah of Balochistan with a view to determine the production cost, current production system, inputoutput ratio and gaps in farm practices and finally suggest the way to fill out these gaps. Total 109 respondents were interviewed from all districts. The study was conducted through primary data collection from different vegetable growers who had planted vegetable crops. The data was collected from selected vegetable growers during the crop year, 2011-12. The additionally, information was gathered the farm size, average cost of production of vegetable was separated into for categories i.e.; fixed costs, capital costs, labor costs and marketing costs in the major vegetable growing areas. The survey results showed that all the vegetable growers applied 15-20 irrigations to vegetable crops in the study area. During the survey mostly farmers reported the production decreased as compared last year due to non-proper management, electricity problem and shortage of water. Vegetable yield in the province is well below the potential.

Sen *et .aI.* (2013) studied economic analysis of garlic production in the Baran District of Rajasthan. The study is carried out to determine break even analysis and constraints of garlic production in the study area. Break even analysis is carried out to arrive at that minimum level at which optimum conditions of cost and returns is equated that is no profit no loss point. Study come up with the result that break even yield and price were increased with increased size of holding- of farmers. The most serious constraints as perceived by the farmers in garlic production were the high price of garlic

seed at time of sowing, high cost of garlic cultivation, unfavourable product price and high cost of irrigation *etc.*

Chavhal *et.al.* (2014) studied marketing cost, marketing margin and price spread of soybean in Parbhani district of Maharashtra. Observed three type of marketing channel in study area. *i.e.* 1. Channel-I Producer-yillage merchant-wholesaler oil processer. 2. Channel- II Producer-wholesaler-Oil processer. 3. Channel- III Producer-oil processer. It was also observed that per quintal marketing cost was higher in channel-I ***i.e.*** Rs. 169.69 followed by Rs. 138.65 in channel- II and Rs.38.80 in channel- III, respectively. Producer's share in consumer's rupee was maximum in channel- III (98.93 %) while minimum in channel-I (83.14 %).

Noonari *et.al.* (2015) net farm income is gross profits remains cash operating expenses and depreciation cost of machinery and equipments costs could be obtained by subtracting the gross revenue from cash operating expenses. Net farm income averages output or gross income after subtracting all farm expenses. Net income is calculated to judge the efficiency of farm business as a whole.

Shende and Meshram (2015) studied constraints in tomato cultivation. They found insect pest attack as major problem (80 per cent) in tomato cultivation followed by lack of finance and ranked by 62.50 per cent.

Kalmegh (2017) studied the breakeven quantity and sensitivity analysis of cut flower roses and work out the economics of floriculture plants under open condition. So that the cultivators analyzes the net returns from these crops and motivate towards adoption of these floriculture cultivation as a primary source of income in Vidarbha region.

CHAPTER - III

MATERIALS AND METHODS

In this chapter details of the methodology adopted in the present investigation are presented. Details are presented under the following headings.

3.1 Collection of data

3.2 Analytical framework

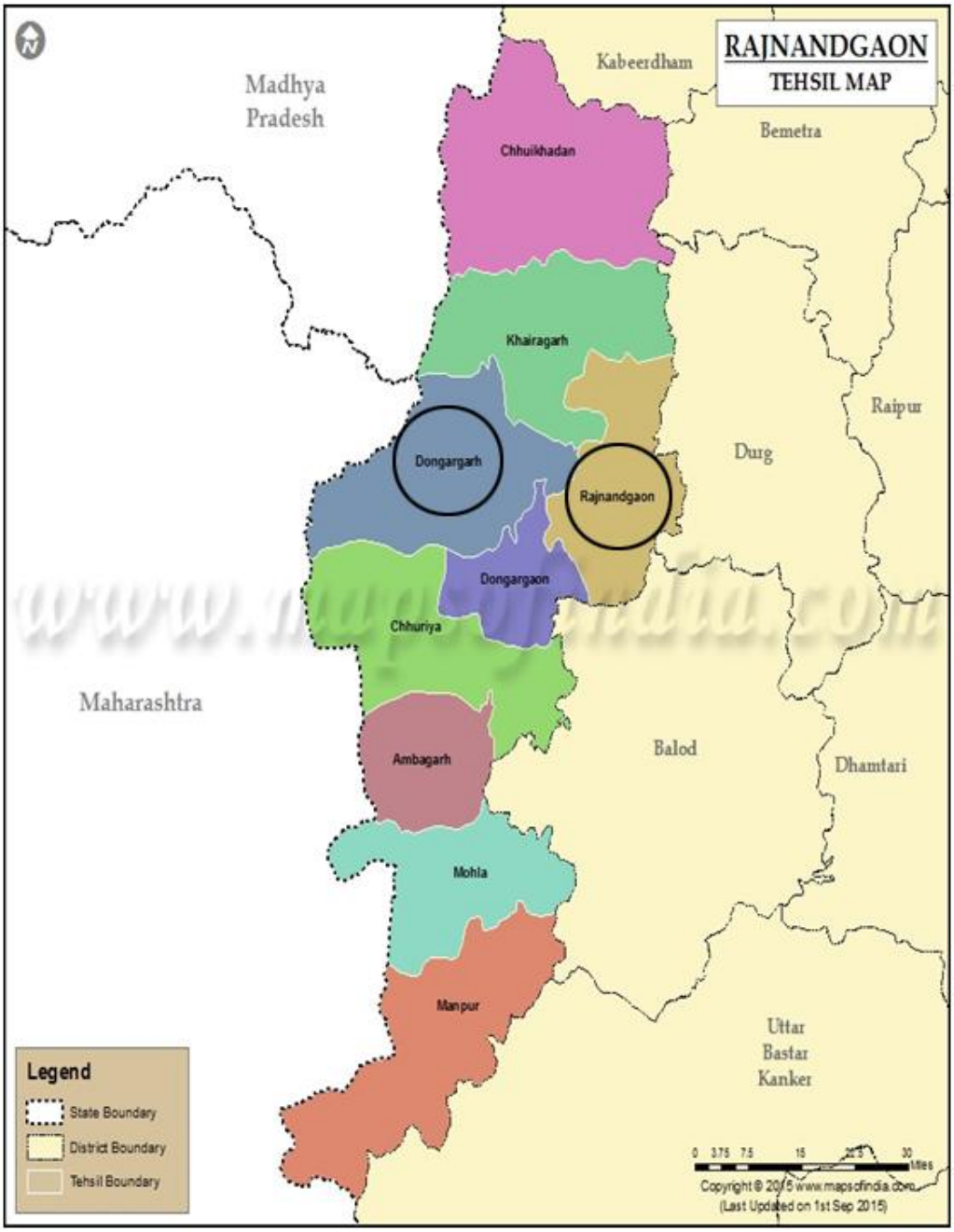
3.3 Background of the study area

3.1 Collection of data

3.1.1 Selection of the study area

Out of 27 districts of Chhattisgarh, Rajnandgaon district was selected purposively. Rajnandgaon district has 9 blocks namely- Chhuikhadan, Khairagarh, Dongargarh, Rajnandgaon, Dongargaon, Chhuriya, Mohla, Manpur and Ambagarh Chowki (Map 3.1 and 3.2).

3.1 Map of Chhattisgarh State



3.2 Map of Study Block (Rajnandgaon and Dongargarh)

Table 3.1: Leading Area and Production Horticultural Crops in Rajnandgaon District (C.G.)

S.No.			1	2	3		1	2	3		1	2	3
Name of crops			Tomato	Brinjal	Other		Mango	Papaya	Other		Chilli	Ginger	Other
Rajnandgaon	Area(in hac.)	Vegetable	394	369	3	Fruits	438	105	5	Spices	326	95	4
	Production(In Mt.)		5023.5	5535	18		1533	1943	25		2119	769	20
Dongargaon	Area(in hac.)		340	354	2		344	76	4		298	90	4
	Production(In Mt.)		4335	5310	12		1204	1406	20		1937	729	20
Dongargarh	Area(in hac.)		314	262	3		330	60	4		251	74	2
	Production(In Mt.)		4003.5	3930	18		1155	1110	20		1631	599	10
Chhuria	Area(in hac.)		176	130	2		225	22	1		159	47	2
	Production(In Mt.)		2244	1950	12		788	407	5		1033.5	380.7	10
A.Chowki	Area(in hac.)		244	198	1		241	16	1		225	55	1
	Production(In Mt.)		3111	2970	6		844	296	5		1462.5	445.5	5
Mohla	Area(in hac.)		172	102	1		274	12	1		179	44	1
	Production(In Mt.)		2193	1530	6		959	222	5		1163.5	356.4	4
Manpur	Area(in hac.)		186	122	1		215	10	1		194	40	1
	Production(In Mt.)		2371.5	1830	6		753	185	5		1261	324	5
Khairagarh	Area(in hac.)		190	179	2		255	24	2		189	51	1
	Production(In Mt.)		2422.5	2685	12		893	444	10		1228.5	413.1	4
Chhuikhadan	Area(in hac.)		254	214	2		278	30	2		224	54	2
	Production(In Mt.)		3238.5	3210	12		973	555	10		1456	437.4	10
Total	Area(in hac.)		2270	1930	17		2600	355	21		2045	550	18
	Production(In Mt.)		28942.5	28950	102		9100	6568	105		13497	4455	88

Source: Office of Deputy Director of Horticulture Rajnandgaon (C.G.).

Above table shows leading crop according to area is tomato in vegetable mango in fruit and chilli in spices.

Tomato in vegetable crops and chilli in spices were selected for studying economic analysis of nursery raiser of these crops while among the fruit crops papaya was selected for economic analysis of nursery raiser because there is private nursery only for papaya. In fruits papaya was selected because of the mango nursery suitably and nursery grown have growing nursery of papaya instead of mango.

3.1.2 Selection of crop

Only two flowers *viz*; marigold and gladiolus are cultivated in Rajnandgaon district and planting materials of these flowers are supplied by other districts and states, there is no nursery for flower in study area. So, one crop from vegetables, fruits and spices has been taken for study on the basis of highest sold out planting material in district during last 5 years.

The selection of planting material sellers of horticultural crops in the block will also be considered for calculating the marketing cost of seedlings.

3.1.3 Selection of nursery and nursery raiser

Nurseries of Rajnandgaon district has been undertaken for vegetable, fruit and spices seedlings for accomplishing the objectives of study.

3.1.4 Data

The study will require both primary and secondary data. Primary data related to cost and return and various constraints in nursery raising has been collected through personal interview method on pre tested well structured schedule. Secondary data regarding area and production of horticultural crops has been collected from official records of Deputy Director of Horticulture and Senior Horticulture Development Officer Rajnandgaon offices. Geographical data of district and block has been collected from the records maintained by district and block government offices.

3.2 Analytical framework

3.2.1 Benefit-cost ratio

For calculating cost of nursery raising of selected horticulture crops, various cost, *viz*; variable and fixed cost were calculated.

To find out the benefits in nursery raising of selected horticulture crops, total and net income was calculated. Profitability in nursery raising was calculated by benefit cost ratio analysis.

Formula of Benefit-Cost Ratio:

$$\text{Benefit-Cost Ratio} = \frac{\sum_{t=0}^{t=n} \frac{B_t}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t}}$$

Where

B = benefit

C = cost

t = time

r = interest rate

The benefit-cost ratio (B/C R) is determined by dividing the revenue generated in the plant nursery by the costs incurred. If B/C R is > 1, then the enterprise is operating at a profit but if B/CR < 1, it is a non-profitable venture.

3.2.2 Marketing cost

Marketing cost of palnting materials grown in nursery was calculated in follwing manner:

Total marketing cost

Total marketing cost was calculated by using the formula of total cost of marketing i.e.

$$C = C_F + C_{m1} + C_{m2} + C_{m3} + \ldots\ldots\ldots\ldots + C_{mn}$$

Where

C = Total cost of marketing of the commodity.

C_F = Cost paid by the producer from the time the produce leaves the farm till he sells it.

C_{mi} = Cost incurred by the *i* th middleman in the process of buying and selling the product.

3.2.3 Marketing margin

Marketing margin is the difference between the total payments (cost + purchase price) and receipts (sale price) of the middleman (*i* th agency).

This will be calculated as:

(a) Absolute margin of *i* th middleman(A_{mi})

$$A_{mi} = P_{Ri} - (P_{Pi} + C_{mi})$$

(b) Percentage margin of *i* th middleman(P_{mi})

$$P_{mi} = \frac{P_{Ri} - (P_{Pi} + C_{mi})}{P_{Ri}} \times 100$$

(c) Percentage marke– up of *i* th middleman(M)

$$Mi = \frac{P_{Ri} - (P_{Pi} + C_{mi})}{P_{Ri}} \times 100$$

Where,

P_{Ri} = Total value of receipts per unit (sale price)

P_{Pi} = Purchase value of goods per unit (purchase price)

C_{mi}= Cost incurred on marketing per unit

The margin thus calculated include the profit of the middleman and the returns which accrue to him for storage, the interest on capital and overhead and establishment expenditure.

3.2.4 Marketing efficiency

Efficiency of marketing channel of planting material in study area will be calculated by ratio of output to input, Shepherd's index of marketing efficiency and Achary's modified marketing efficiency method. Formula for marketing efficiency are as follows:

a. Ratio of Output to Input

$$E = \frac{O}{I} \times 100$$

Where,

E = index of marketing efficiency

O = output of marketing system

I = input of marketing system

b. Shepherd's index of marketing efficiency = $\frac{\text{Retailer's sale price}}{\text{Total marketing cost}}$

c. $$MME = \frac{FP}{(MC + MM)}$$

MME = modified measure of marketing efficiency

FP = Prices received by the farmer

MC = marketing cost

MM = marketing margins

3.2.5 Garret ranking technique

To find out the constraints in nursery raising of tomato, chilli and papaya by selected nursery raisers were procured. Finally, the constraints will be prioritized by using Garrett's ranking technique in the following manner:

$$\text{Percentage position} = \frac{100(Rij - 0.5)}{Ni}$$

Where,

Rij = Rank given for the i^{th} item by the j^{th}, respondent and

Nj = Number of items ranked by the j^{th}, respondent

The percentage position of each rank was converted into scores using Garrett table. For each constraint, scores of individual respondents was added together and divided by total number of respondents for whom scores were added. Then, mean score for each constraint was ranked by arranging them in the descending order.

Table 3.2: Garret table, for converting order of merit into units of measure or scores

% (percent position)	Score	% (percent position)	Score	% (percent position)	Score
.09	99	22.32	65	83.31	31
.20	98	23.88	64	84.56	30
.32	97	25.48	63	85.75	29
.45	96	27.15	62	86.86	28
.61	95	28.86	61	87.96	27
.78	94	30.61	60	88.97	26
.97	93	32.42	59	89.94	25
1.18	92	34.25	58	90.83	24
1.42	91	36.15	57	91.67	23
1.68	90	38.06	56	92.45	22
1.96	89	40.01	55	93.19	21
2.28	88	41.97	54	93.86	20

2.63	87	43.97	53	94.49	19
3.01	86	45.97	52	95.08	18
3.43	85	47.98	51	95.62	17
3.89	84	50.00	50	96.11	16
4.38	83	52.02	49	96.57	15
4.92	82	54.03	48	96.99	14
5.51	81	56.03	47	97.37	13
6.14	80	58.03	46	97.72	12
6.81	79	59.99	45	98.04	11
7.55	78	61.94	44	98.32	10
8.33	77	63.85	43	98.58	9
9.17	76	65.75	42	98.82	8
10.06	75	67.48	41	99.03	7
11.03	74	69.39	40	99.22	6
12.04	73	71.14	39	99.39	5
13.11	72	72.85	38	99.55	4
14.25	71	74.52	37	99.68	3
15.44	70	76.12	36	99.80	2
16.69	69	77.68	35	99.91	1
18.01	68	79.17	34	100.00	0
19.39	67	80.61	33		
20.93	66	81.99	32		

Source: Garret (1990) Varnatmak Sankheyki "Mansik Parikshan avam Mnovaganik Aankdo ka Parimapan. Pp 282-283.

3.3 Background of the study area

3.3.1 Situation of the Rajnandgaon district

Rajnandgaon district is situated in the western corner of the state and lies between 20^0 07'and 22^0 29'narth latitudes and 80^0 23 and 81^0 24' eastern longitudes with varying elevation ranging from 330 to 350 meters above mean sea level. This district has an area of 8023 sq. km. consisting of 1708 total village. Out of which 1703 are habitat villages and 5 are forest villages. This district is bounded on the north by Kabirdham district of Chhattisgarh, on the east Durg district of Chhattisgarh, on the south Garhchirouli district of Maharastra and Kanker (North Bastar) district of Chhattisgarh, on the west by Maharastra and some part of Madhya Pradesh . The total geographical area of Rajnandgaon district is considered as tropical 33region, which is hot with moisture in environment. Rajnandgaon district rich in inception and vertisol. The topography of Rajnandgaon district is comes under plain region of Chhattisgarh state. Average annual rainfall is 1274.00 mm.

3.3.2 Demographic features of Rajnandgaon district

Demographic features of Rajnandgaon district is presented in table 3.1. The total population of Rajnandgaon district is 1283224 (Census 2010). Out of which 81.94 per cent is rural and 18.83 per cent in the urban. The density of population is 159 Per sq. km. The literacy rate in the district was 77.44 per cent and sex ratio of Rajnandgaon district is 1023 female per 100 male.

Table 3.3: Demographic features of Rajnandgaon District

S. No.	Particulars	Rajnandgaon district
1	**Total Population (‟000 Nos)**	**1283224**
	a. Male	634342
	b. Female	648882
	c. Total	1283224
	d. Urban	231647
	e. Rural	1051577
2	Percentage of rural population to total population (%)	81.94%
3	Percentage of SC population to total population (%)	9.92%
4	Percentage of ST Population in Total Population (%)	26.62%
5	**Population density per sq. km.**	**159**
6	**Population Growth Rate (1991-2001)**	**17.83**
7	Percentage of district population to state population	6.43%
8	**No. of Literates 2010 (Nos)**	**997676**
	a. Male	554638
	b. Female	443038
9	Literacy Rates (%)	
	a. Male	87.20%
	b. Female	67.60%
	c. Total	**77.40%**
10	Rural Literacy Rates (%)	
	a. Male	87.4
	b. Female	65.1
	c. Total	**76.35%**
11	Urban Literacy Rates (%)	
	a. Male	91.8
	b. Female	73.9
	c. Total	**82.85%**
12	Agricultural labour (%)	35.21%
13	Total Worker (%)	45.98%
14	**Sex Ratio (Female / 1000)**	**1023**
	a. Urban	937
	b. Rural	1057

Source: District Statistical booklet (2010-11), District planning and Statistical Office, Rajnandgaon (C.G.).

3.3.3 Sources of irrigation

Source wise irrigated area is presented in table 3.2. Lack of irrigation is the main problem in this area. Most of the farmers depend on the rains to take the paddy crop in Kharif season. Due to lake of irrigation water more than 70 per cent land is kept fallow in Rabi season in which rain fed paddy crop was being grown in Kharif season. Table indicates that tub- well is main source of irrigation and covers more than 77.95 per cent area of the total irrigated area in the district. Other sources of irrigation is ponds, canal and wells, which contribute more than 22.05 per cent area of the total irrigated area in the district.

Table 3.4: Source wise irrigated area in Rajnandgaon District

S.No.	Particulars	Area (ha.)	Percentage to total area
1	Canal	3812	5.49
2	Tub-well	54158	77.95
3	Well	4425	6.37
4	Pond	3765	5.42
5	Irrigated area from other sources	3315	4.77
6	Gross irrigated area	69475	100

Source: District Statistical booklet (2010-11), District planning and Statistical Office, Rajnandgaon (C.G.).

3.3.4 Land Utilization Pattern of Rajnandgaon District

The land utilization pattern of the study area is presented in table 3.3. It is clear from that the geographical area of the Rajnandgaon district is 802229 hectares. The net area and gross area sown in the Rajnandgaon district is 45.42 and 70.80 per cent respectively .The percentage of forest area in study area is 32.34 per cent and cropping intensity of the Rajnandgaon district was 136.18 per cent.

Table 3.5: Land Utilization Pattern of Rajnandgaon District.

S.No.	Particulars	Area (ha.)	Percentage to total geographical area
1	Total geographical area	802229	100
2	Area under forest	259474	32.34
3	Land under non agricultural use	18662	2.32
4	Permanent pasture and grazing land	53825	6.7
5	Cultivable waste land	66418	8.27
6	Fallow land(old fallow and current fallow)	35491	4.42
7	Land under miscellanies	3969	0.53
8	Net cropped area	364390	45.42
9	Gross cropped area	551973	70.8
10	**Cropping intensity (%)**	**136.18**	

Source: District Statistical booklet (2010-11), District Planning and Statistical Office, Rajnandgaon (C.G.).

3.3.5 Cropping pattern of Rajnandgaon District

Paddy is the major crop occupying the largest area to the total cropped area (Table 3.4). Chickpea, Soybean and Wheat are another crops. The average yield of principal crops grown in the district is quite low.

Table 3.6: Cropping pattern of Rajnandgaon District

S.No.	Season / Crop	Area (in ha.)	Percentage to total area
A.	**Kharif**		
1	Rice	158358.67	(31.30)
2	Maize	4896	(0.96)
3	Jowar	40	(0.09)
4	Other cereals	7620	(1.51)
5	Arhar	24560	(4.86)
6	Moong	4147	(0.82)
7	Urd	18532	(3.66)
8	Tiwda	23977	(4.74)
9	Soyabean	48470	(9.58)
10	Groundnut	20	(0.004)
11	Sunflower	97	(0.01)
12	Til	4900	(0.97)
13	Sugarcane	10.5	(0.002)
14	Vegetables/Others	11067.5	(2.18)
	Sub Total	**306695.67**	**60.65**
B.	**Rabi**		
15	Wheat	25560	(5.05)
16	Rice	79179.33	(15.65)
17	Maize	2448	(0.48)
18	Jowar	20	(0.003)
19	Sugarcane	10.5	(0.002)
20	Gram	57534	(11.37)
21	Pea	1565	(0.31)
22	Masoor	1984	(0.39)
23	Kulthi	4434	(0.88)
24	Mustard	4158	(0.82)
25	Linseed	10499	(2.07)
26	Safflower	512	(0.10)
27	Sunflower	194	(0.03)
28	Ramtil	10	(0.002)
29	Vegetables/Others	11067.5	(2.18)
	Sub Total	**199125.33**	**39.35**
	Total	**505821**	**(100.00)**

Source: Agriculture Department of C.G. Government, District-Rajnandgaon (2010-11).

3.3.6 Distribution of land holding in Rajnandgaon District

The distribution of land holding in Rajnandgaon district according to size and the total cultivated area falling in each category are given in table 3.5. The number of marginal farmers were observed as highest (about 50 per cent) in the district. Similarly, numbers of small and large farmers were about 25 and 25 per cent respectively in the district. These figures revealed that only 25 per cent farmers have only above 2 hectares of land.

Table3.7: Distribution of land holding in Rajnandgaon District

S.No.	Particulars	No. of holdings	Percentage to total area
1	Marginal (Less than 1 ha.)	127726	49.98
2	Small (1 to 2 ha.)	64068	25.07
3	Large (More than 2 ha.)	63752	24.95
4	Total	255546	100

Source: Agriculture Department of C.G. Government, District-Rajnandgaon (2010-11).

CHAPTER - IV

RESULTS AND DISCUSSION

The present chapter deals with the results and discussion of various objectives of the study. The chapter is arranged in different sub-sections according to objectives of the study.

4.1 To work out the cost benefit analysis of the nursery raising of selected horticultural crops.

4.2 To estimate the marketing cost, marketing margin and efficiency in marketing of planting material of selected horticultural crops.

4.3 To find out the constraints in nursery raising of selected horticultural crops and suggest suitable measures to overcome them.

4.1 To work out the cost benefit analysis of the nursery raising of selected horticultural crops

In study area there was two type of tomato seedlings nursery raising i.e. open field nursery and temporary shade net nursery input cost incurred in both type of nursery raising had been calculated separately.

4.1.1 Input cost of tomato seedlings nursery raising, nursery size 100 meter^2 (open field)

Input cost of tomato seedlings nursery raising, nursery size of 100 meter^2 in open field is presented in table 4.1. From the table it can be observed that fixed cost, cost of watering can was highest 400₹ covering (3.97%) of total cost, followed by rental value of land 350₹ (3.47%), knapsack sprayer 300 ₹ (2.98 %), pick mattock 105 ₹ (1.04%), shovel 100₹ (0.99%), pick axe 100₹ (0.99%), trowel 90₹ (0.89%), and spade 80₹ (0.79%). In case of variable cost it was observed that from material

cost, treated seed cost was highest 6750₹ covering (67.10%) of total cost. Compare to the other needed materials for tomato seedlings nursery. In terms of labour cost hired human labour expenditure was more 600₹ covering (5.96%) of total cost. Compare to family human labour 450₹ (4.47%) and bullock labour 10₹ (0.09%).

Table 4.1: Input cost of tomato seedlings nursery raising, nursery size 100 meter^2 in open field (N = 30 nursery raiser)

A.	**Fixed cost items**						
S. No.	**Item**	**Qty.**	**Unit cost(₹)**	**Total purchase cost(₹)**	**Expected life**	**Total cost per annum (₹)**	**%**
1	Pick mattock	3 No.	140	420	4	105	1.04
2	Trowel	3 No.	120	360	4	90	0.89
3	Spade	2 No.	160	320	4	80	0.79
4	Watering can	2 No.	800	1600	4	400	3.97
5	Shovel	1 No.	400	400	4	100	0.99
6	Pick axe	1 No.	400	400	4	100	0.99
7	Knapsack sprayer	1 No.	1200	1200	4	300	2.98
8	Rental value of land	-	-	-	-	350	3.47
	Sub Total	**-**	**-**	**-**	**-**	**1525**	

B.	Variable cost items				
B (1)	Material cost				
S. No.	Item	Qty.	Price per unit(₹)	Total cost per annum(₹)	%
9	Seed (Treated Seed)	0.15 kg	450 ₹. / 10 gram	6750	67.10
10	Vermicompost	20 kg	15 ₹. / kg	300	2.98
11	FYM	20 kg	3 ₹. / kg	60	0.59
12	Fertilizer	0.25 kg	48 ₹. / 250 gram	48	0.47
13	Plant protection chemicals	0.01 kg	10 ₹. / 10 gram	10	0.09
14	Paddy straw	2 kg	3 ₹. / kg	6	0.05

B (2)	**Labour cost**				
15	**Bullock labour**				
	Hired	10 minutes	(10 minutes) 10 ₹.	10	0.09
16	**Family human labour**				
	(Field preparation, sowing, application of manures & fertilizer, irrigation, inter culture, plant protection and uprooting)	3 Labour day	@150 ₹. / Labour day	450	4.47
	Hired Human Labour				
	(Field preparation, sowing, application of manures & fertilizer, irrigation, inter culture, plant protection and uprooting)	4 Labour day	@150 ₹. / Labour day	600	5.96
17	Miscellaneous	**-**	**-**	300	2.98
	Sub Total	**-**	**-**	**1360**	
	Grand Total (A + B)	**-**	**-**	**10059**	

4.1.2 Profitability in tomato seedlings (open field)

The profitability in tomato seedlings was estimated in table 4.2 and it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of tomato seedlings in open field was profitable.

Table 4.2: Profitability in tomato seedlings (open field)

Seedlings yield	Market price / Unit	Total income (₹)	Net income (₹)
21000 Seedlings	1 ₹. / seedlings	21000 ₹.	10941₹.

$$\text{Input-Output Ratio} = \frac{\text{Total Income}}{\text{Total Cost}}$$

$$= \frac{21000}{10059}$$

Input -Output Ratio = 1:2.08

$$\text{Benefit- Cost Ratio} = \frac{\text{Net income}}{\text{Total cost}}$$

$$= \frac{10941}{10059}$$

Benefit-Cost Ratio = 1:1.08

4.1.3 Input cost of tomato seedlings nursery raising, nursery size 100 meter^2 (temporary shade net)

Input cost of tomato seedlings in temporary shade net nursery raising, nursery size of 100 meter^2 is presented in table 4.3. From the table it can be observed that fixed cost, cost of temporary shade net with making charge was highest 750₹ covering (3.10%) of total cost, followed by watering can 400₹ (1.65%), rental value of land 350₹ (1.44%), knapsack sprayer 300₹ (1.24%), shovel 100₹ (0.41%), trowel 90₹ (0.37%) and spade 80₹ (0.33%). In case of variable cost it was observed that from material cost, treated seed cost was highest 12500₹ covering (51.69%) of total cost. Compare to the other needed materials for tomato seedlings in temporary shade net nursery. In terms of labour cost hired human labour expenditure was 750₹ (3.10%).

Table 4.3: Input cost of tomato seedlings nursery size 100 meter^2 (N = 20 nursery raiser)

A.	**Fixed cost items**						
S. No.	**Item**	**Qty.**	**Unit cost (₹.)**	**Total purchase cost (₹.)**	**Expected life**	**Total cost per annum (₹.)**	**%**
1	Trowel	3 No.	120	360	4	90	0.37
2	Spade	2 No.	160	320	4	80	0.33
3	Watering can	2 No.	800	1600	4	400	1.65
4	Shovel	1 No.	400	400	4	100	0.41
5	Knapsack sprayer	1 No.	1200	1200	4	300	1.24

6	Shade net house (making charge + bamboo)	50 mete (shade net) and 6 Number (bamboo)	39 (shade net) and 50 (bamboo)	2250	3	750	3.10
7	Rental value of land	-	-	-	-	350	1.44
	Sub Total	-	-	-	-	**2070**	

B.	**Variable cost items**				
B (1)	**Material cost**				
S. No.	**Item**	**Qty.**	**Price per unit(₹)**	**Total cost per annum(₹)**	**%**
8	Seed (Treated Seed)	0.25 kg	500 ₹. / 10 gram	12500	51.69
9	Seedlings tray	500 no.	8 ₹. / seedlings tray	4000	16.54
10	Vermicompost	250 kg	8 ₹. / kg	2000	8.27
11	Cocopeat	250 kg	10 ₹. / kg	2500	10.33
12	Fertilizer	0.25 kg	48 ₹. / 250 gram	48	0.19
13	Plant protection chemicals	0.01 kg	10 ₹. / 10 gram	10	0.04

B (2)	**Labour cost**				
14	**Hired Human Labour**				
	(Seedling tray filling, sowing, application of manures & fertilizer, irrigation, inter-culture, plant protection and uprooting)	5 Labour day	@150 ₹. / Labour day	750	3.10
15	Miscellaneous	-	-	300	1.24
	Sub Total	-	-	**22108**	
	Grand Total (A + B)	-	-	**24178**	

4.1.4 Profitability in tomato seedlings (temporary shade net)

The profitability in tomato seedlings was estimated in table 4.4 and it was found that input-output ratio was 1:2.97 while benefit cost ratio was 1:1.97 respectively, indicating that raising of tomato seedlings in temporary shade net was more profitability than open field nursery.

Table 4.4: Profitability in tomato seedlings (temporary shade net)

Seedlings yield	Market price / Unit	Total income (₹.)	Net income (₹.)
48000 Seedlings	1.5 ₹. / seedlings	72000 ₹.	47822 ₹.

$$\text{Input-Output Ratio} = \frac{\text{Total Income}}{\text{Total Cost}}$$

$$= \frac{72000}{24178}$$

Input -Output Ratio = 1:2.97

$$\text{Benefit-Cost Ratio} = \frac{\text{Net income}}{\text{Total cost}}$$

$$= \frac{47822}{24178}$$

Benefit Cost Ratio = 1:1.97

In study area there was two type of chilli seedlings nursery raising i.e. open field nursery and temporary shade net nursery input cost incurred in both type of nursery raising had been calculated separately.

4.1.5 Input cost of chilli seedlings nursery raising, nursery size 100 meter^2 (open field)

Input cost of chilli seedlings nursery raising, nursery size of 100 meter^2 in open field is presented in table 4.5. From the table it can be observed that fixed cost, cost of wateringcan was highest 400₹ covering (3.79%) of total cost, followed by rental value of land 370₹ (3.15%), knapsack sprayer 300₹ (2.84%), pick mattock 105₹ (0.99%), shovel 100₹ (0.94%), pick axe 100₹ (0.94%), trowel 90₹ (0.85%) spade 80₹ (0.75%). In case of variable cost it was observed that from material cost, treated seed cost was highest 7200₹ covering (68.38%) of total cost. Compare to the other needed materials for chilli seedlings nursery. In terms of labour cost hired human labour expenditure was more 600₹ (5.69%) compare to family human labour 450₹ (4.27%) and bullock labour 10₹ (0.09%).

Table 4.5 Input cost of chilli seedlings nursery raising, nursery size 100 meter^2 in open field (N = 30 nursery raiser)

A.	**Fixed cost items**						
S. No.	**Item**	**Qty.**	**Unit cost (₹.)**	**Total purchase cost(₹.)**	**Expected life**	**Total cost per annum(₹.)**	**%**
1	Pick mattock	3 No.	140	420	4	105	0.99
2	Trowel	3 No.	120	360	4	90	0.85
3	Spade	2 No.	160	320	4	80	0.75
4	Watering can	2 No.	800	1600	4	400	3.79
5	Shovel	1 No.	400	400	4	100	0.94
6	Pick Axe	1 No.	400	400	4	100	0.94
7	Knapsack sprayer	1 No.	1200	1200	4	300	2.84
8	Rental value of land	-	-	-	-	370	3.51
	Sub Total	-	-	-	-	**1525**	

B.	**Variable cost items**				
B (1)	**Material cost**				
S. No.	**Item**	**Qty.**	**Price per unit(₹)**	**Total cost per annum(₹)**	**%**
9	Seed (Treated Seed)	0.15 kg	480 ₹. / 10 gram	7200	68.38
10	Vermicompost	20 kg	15 ₹. / kg	300	2.84
11	FYM	20 kg	3 ₹. / kg	60	0.56
12	Fertilizer	0.25 kg	48 ₹. / 250 gram	48	0.45
13	Plant protection chemicals	0.01 kg	10 ₹. / 10 gram	10	0.09
14	Paddy straw	2 kg	3 ₹. / kg	6	0.05

B (2)	**Labour cost**				
15	**Bullock labour**				
	Hired	10 minutes	(10 minutes) 10 ₹.	10	0.09
	Family human labour				
	(Field preparation, sowing, application of manures & fertilizer, irrigation, Inter culture, plant protection and uprooting)	3 Labour day	@150 ₹. / Labour day	450	4.27
16	**Hired Human Labour**				
	(Field preparation, sowing, application of manures & fertilizer, irrigation, inter culture, plant protection and uprooting)	4 Labour day	@150 ₹. / Labour day	600	5.69
17	Miscellaneous	-	-	300	2.84
	Sub Total	-	-	**1360**	
	Grand Total (A + B)	-	-	**10529**	

4.1.6 Profitability chilli seedlings (open field)

The profitability in chilli seedlings was estimated in table 4.6 and it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of chilli seedlings in open field was profitable.

Table 4.6: Profitability in chilli seedlings (open field)

Seedlings yield	Market price / Unit	Total income (₹.)	Net income (₹.)
22000 Seedlings	1 ₹. / seedlings	22000 ₹.	11417₹.

$$\text{Input-Output Ratio} = \frac{\text{Total Income}}{\text{Total Cost}}$$

$$= \frac{22000}{10529}$$

Input-Output Ratio = 1:2.08

$$\text{Benefit-Cost Ratio} = \frac{\text{Net income}}{\text{Total cost}}$$

$$= \frac{11417}{10529}$$

Benefit-Cost Ratio = 1:1.08

4.1.7 Input cost of chilli seedlings nursery raising, nursery size 100 meter^2 (temporary shade net)

Input cost of chilli seedlings in temporary shade net nursery raising, nursery size of 100 meter^2 is presented in table 4.7. From the table it can be observed that fixed cost, cost of temporary shade net with making charge was highest 750₹ covering (3.27%) of total cost, followed by watering can 400₹ (1.74%), rental value of land 350₹ (1.52%), knapsack sprayer 300₹ (1.30 %), shovel 100₹ (0.43%), trowel 90₹ (0.39%) and spade 80₹ (0.34%). In case of variable cost it was observed that from material cost, treated seed cost was highest 11250 ₹ covering (49.06%) of total cost. Compare to the other needed materials for chilli seedlings in temporary shade net nursery. In terms of labour cost hired human labour expenditure was 750₹ (3.27%).

Table 4.7: Input cost of chilli seedlings nursery raising, nursery size 100 meter^2 (N = 20 nursery raiser)

A.	**Fixed cost items**						
S. No.	**Item**	**Qty.**	**Unit cost (₹.)**	**Total purchase cost (₹.)**	**Expected life**	**Total cost per annum (₹.)**	**%**
1	Trowel	3 No.	120	360	4	90	0.39
2	Spade	2 No.	160	320	4	80	0.34
3	Watering can	2 No.	800	1600	4	400	1.74
4	Shovel	1 No.	400	400	4	100	0.43
5	Knapsack sprayer	1 No.	1200	1200	4	300	1.30

6	Shade net house (making charge + bamboo)	50 meter (shade net) and 6 number (bamboo)	39 (shade net) and 50 (bamboo)	2250	3	750	3.27
7	Rental value of land	-	-	-	-	350	1.52
	Sub Total	-	-	-	-	**2070**	

B.	**Variable cost items**				
B (1)	**Material cost**				
S. No.	**Item**	**Qty.**	**Price per unit(₹)**	**Total cost per annum(₹)**	**%**
8	Seed (Treated seed)	0.25 kg	450 ₹. / 10 gram	11250	49.06
9	Seedlings tray	500 No.	8 ₹. / seedlings tray	4000	17.44
10	Vermicompost	250 kg	8 ₹. / kg	2000	8.72
11	Cocopeat	250 kg	10 ₹. / kg	2500	10.90
12	Fertilizer	0.25 kg	48 ₹. / 250 gram	48	0.20
13	Plant protection chemicals	0.01 kg	10 ₹. / 10 gram	10	0.04

B (2)	**Labour cost**				
	Hired Human Labour				
14	(Seedling tray filling, sowing, application of manures & fertilizer, irrigation, inter culture, plant protection and uprooting)	5 Labour day	@150 ₹. / Labour day	750	3.27
15	Miscellaneous	-	-	300	1.30
	Sub Total	-	-	**20858**	
	Grand Total (A + B)	-	-	**22928**	

4.1.8 Profitability in chilli seedlings (temporary shade net)

The profitability in chilli seedlings was estimated in table 4.8 and it was found that input-output ratio was 1:3.10 while benefit-cost ratio was 1:2.10 respectively, indicating that raising of chilli seedlings in temporary shade net was profitability than open field nursery.

Table 4.8: Profitability in chilli seedlings (temporary shade net)

Seedlings yield	Market price / Unit	Total income (₹.)	Net income (₹.)
47500 Seedlings	1.5 ₹. / seedlings	71250 ₹.	48322 ₹.

$$\text{Input-Output Ratio} = \frac{\text{Total Income}}{\text{Total Cost}}$$

$$= \frac{71250}{22928}$$

Input-Output Ratio = 1:3.10

$$\text{Benefit-Cost Ratio} = \frac{\text{Net income}}{\text{Total cost}}$$

$$= \frac{48322}{22928}$$

Benefit-Cost Ratio = 1:2.10

In study area there was only one type of papaya seedlings nursery raising i.e. temporary shade net nursery and input cost incurred had been calculated.

4.1.9 Input cost of papaya seedlings nursery raising, nursery size 100 meter^2 (temporary shade net)

Input cost of papaya seedlings in temporary shade net nursery raising nursery size of 100 meter^2 is presented in table 4.9. From the table it can be observed that fixed cost, cost of temporary shade net with making charge was highest 767₹ covering (3.58%) of total cost, followed by watering can 400₹ (1.86%), rental value of land 350₹ (1.63%), knapsack sprayer 300₹ (1.40 %),

shovel 100₹ (0.46%), pick axe 100₹ (0.46%), trowel 90₹ (0.42%), spade 80₹ (0.37%) and pick mattock 70₹ (0.32%). In case of variable cost it was observed that from material cost, treated seed cost was highest 12500₹ covering (58.36%) of total cost. Compare to the other needed materials for papaya seedlings in temporary shade net nursery. In terms of labour cost hired human labour expenditure was 750₹ (3.50%).

Table 4.9: Input cost of papaya seedlings nursery raising, nursery size 100 meter^2 (N = 30 nursery raiser)

A.	**Fixed cost items**						
S. No.	**Item**	**Qty.**	**Unit cost (₹.)**	**Total purchase cost (₹.)**	**Expected life**	**Total cost per annum (₹.)**	**%**
1	Trowel	3 No.	120	360	4	90	0.42
2	Pick mattock	2 No.	140	280	4	70	0.32
3	Spade	2 No.	160	320	4	80	0.37
4	Watering can	2 No.	800	1600	4	400	1.86
5	Pick axe	1 No.	400	400	4	100	0.46
6	Shovel	1 No.	400	400	4	100	0.46

7	Knapsack sprayer	1 No.	1200	1200	4	300	1.40
8	Shade net house (making charge + bamboo)	50 meter (shade net) and 6 number (bamboo)	40 (shade net) and 50 (bamboo)	2300	3	767	3.58
9	Rental value of land	-	-	-	-	350	1.63
	Sub Total	**-**	**-**	**-**	**-**	**2257**	

B.	**Variable cost items**				
B (1)	**Material cost**				
S. No.	**Item**	**Qty.**	**Price per unit(₹)**	**Total cost per annum(₹)**	**%**
10	Seed (Treated seed)	0.25 kg	500 ₹. / 10 gram	12500	58.36
11	Polybag	80 kg	25 ₹. / kg	2000	9.33
12	Vermicompost	400 kg	8 ₹. / kg	3200	14.94
13	Sand	200 kg	2 ₹. / kg	400	1.86
14	Plant protection chemicals	0.01 kg	10 ₹. / 10 gram	10	0.04

B (2)	**Labour cost**				
15	**Hired Human Labour**				
	(Poly bag filling, sowing, application of manures and irrigation, application of inter culture and plant protection)	5 Labour day	@150 ₹. / Labour day	750	3.50
16	Miscellaneous	-	-	300	1.40
	Sub Total	-	-	**19160**	
	Grand Total (A + B)	-	-	**21417**	

4.1.10 Profitability in papaya seedlings (temporary shade net)

The profitability in papaya seedlings was estimated in table 4.10 and it was found that input-output ratio was 1:3.92 while benefit-cost ratio was 1:2.92 respectively, indicating that raising of papaya seedlings in temporary shade net was profitable.

Table 4.10: Profitability in papaya seedlings (temporary shade net)

Seedlings yield	**Market price / Unit**	**Total income (₹.)**	**Net income (₹.)**
12000 Seedlings	7 ₹. / seedlings	84000 ₹.	62583 ₹.

$$\text{Input-Output Ratio} = \frac{\text{Total Income}}{\text{Total Cost}}$$

$$= \frac{84000}{21417}$$

Input-Output Ratio = 1:3.92

$$\text{Benefit - Cost Ratio} = \frac{\text{Net income}}{\text{Total cost}}$$

$$= \frac{62853}{21417}$$

Benefit - Cost Ratio = 1:2.92

4.2 To estimate the marketing cost, marketing margin and efficiency in marketing of planting material of selected horticultural crops

4.2.1 Marketing channel used in different type of nursery and mode of transportation of seedlings

It was observed that in the open field type of nursery the marketing channel for tomato, chilli and papaya seedlings was of two types i.e. channel-I from nursery raiser to crop grower of the same village and channel-II from nursery raiser to crop grower of the other village of the same district. This signifies that marketing channel of the open field nursery type was a direct channel without the involvement of the intermediaries i.e. From nursery raiser to crop grower it was also observed that the procured seedlings was transported by two wheeler only from nursery raiser field to the crop grower of the same village of the same district.

Whereas, in case of the shade net nursery type the marketing channel of the tomato, chilli and papaya seedlings was almost same with that of the marketing channel in the open field except this nursery type includes channel- III i.e. from nursery raiser to crop grower of the other district which was the absent in the open field nursery.

Table 4.11: Marketing channel and mode of transportation used various type of nursery

Type of nursery	Marketing Channel (tomato, chilli and papaya seedlings)	Channel adopted by number of nursery raiser			Mode of transportation
Open field	(Sale in Nursery raiser field) I. Nursery raiser —› Crop grower of same village.	Tomato 20 (30)	Chilli 15 (30)		Temporary packaging like plastic pan and transportation by two wheeler.
	II. Nursery raiser —› Crop grower of other villages of same district.	Tomato 15 (30)	Chilli 15 (30)		
Shade net	(Pre order sale in Nursery raiser field) I. Nursery raiser —› Crop grower of same village.	Tomato 10 (20)	Chilli 10 (20)	Papaya 10 (30)	Permanent packaging like plastic bag, plastic rake, plastic bucket, seedlings tray and transportation by small pickup and two wheeler.
	II. Nursery raiser —› Crop grower of other villages of same district.	Tomato 8 (20)	Chilli 5 (20)	Papaya 20 (30)	
	III. Nursery raiser —› Crop grower of other district.	Tomato 5 (20)	Chilli 10 (20)	Papaya 8 (30)	

4.2.2 Marketing cost of tomato seedlings open field in channel – I (seedlings sold at same village)

Marketing cost of tomato seedlings in channel- I was presented in table (4.12 and figure 4.1). It can be clearly seen from the table the marketing cost of tomato seedlings i.e. from nursery raiser to crop grower of seedlings sold at same village. The highest marketing cost was observed in the plastic pan 80 ₹.(38%) followed by transportation 50 ₹.(23%) loading and unloading charges 30₹.(14%), seedlings loss 30₹.(14%) and other charges. Marketing cost of 20000 seedlings has been calculated secure 20000 seedlings can be transported in one time.

Table 4.12: Marketing cost of tomato seedlings in channel – I (seedlings sold at same village)

Marketing cost of tomato seedlings incurred by crop grower of seedlings sold at same village in Rajnandgaon district (N = 20)		
Channel - I (Nursery raiser —› Crop grower)		
S.No.	**Particulars**	**Crop grower (₹. / 20000 seedlings)**
1	Transportation	50 (24%)
2	Loading & unloading charges	30 (14%)
3	Plastic pan	80 (38%)
4	Seedlings loss	30 (14%)
5	Miscellaneous	20 (10%)
	Total cost	**210**

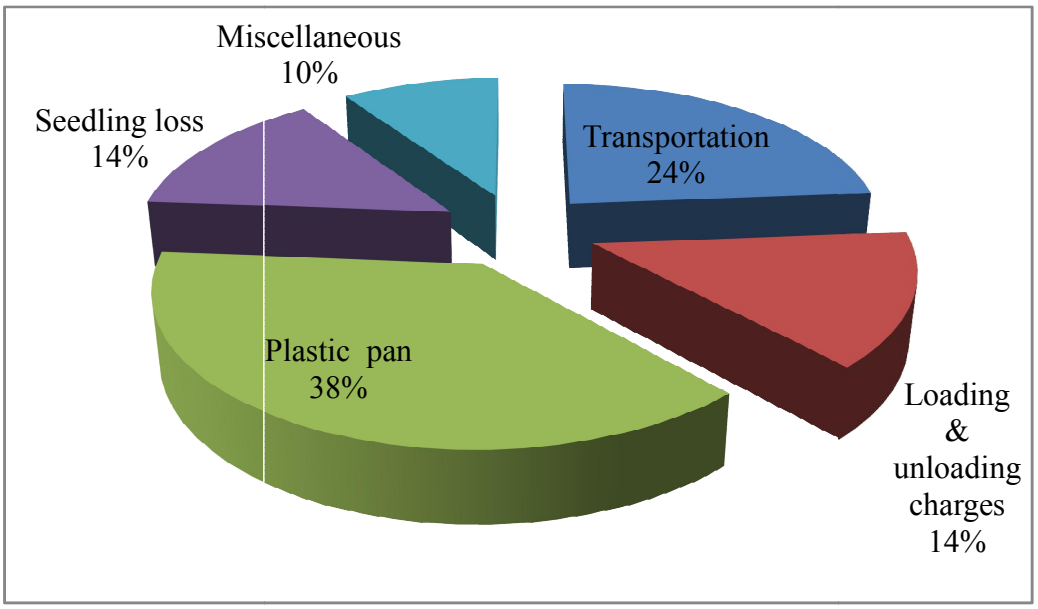


Fig.-4.1 Marketing cost of tomato seedlings in channel – I (seedlings sold at same village) (type of nursery - open field)

4.2.3 Marketing cost of tomato seedlings open field in channel - II (seedlings sold at other villages of same district)

Marketing cost of tomato seedlings in channel- II was presented in table (4.13 and figure 4.2). It can be clearly seen from the table the marketing cost of tomato seedlings i.e. from nursery raiser to crop grower of seedlings sold at other villages of same district. The highest marketing cost was observed in the transportation 100 ₹.(36%) and plastic pan 100₹. (36%) followed by loading and unloading charges 30₹.(10%), seedlings loss 30₹.(10%) and other charges. Marketing cost of 20000 seedlings has been calculated secure 20000 seedlings can be transported in one time.

Table 4.13: Marketing cost of tomato seedlings in channel - II (seedlings sold at other villages of same district)

Marketing cost of tomato seedlings incurred by crop grower of seedlings sold at other villages of same district (N = 15)		
Channel - II (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 20000 seedlings)**
1	Transportation	100 (36%)
2	Loading & unloading charges	30 (10%)
3	Plastic pan	100 (36%)
4	Seedlings loss	30 (10%)
5	Miscellaneous	20 (7%)
	Total cost	**280**

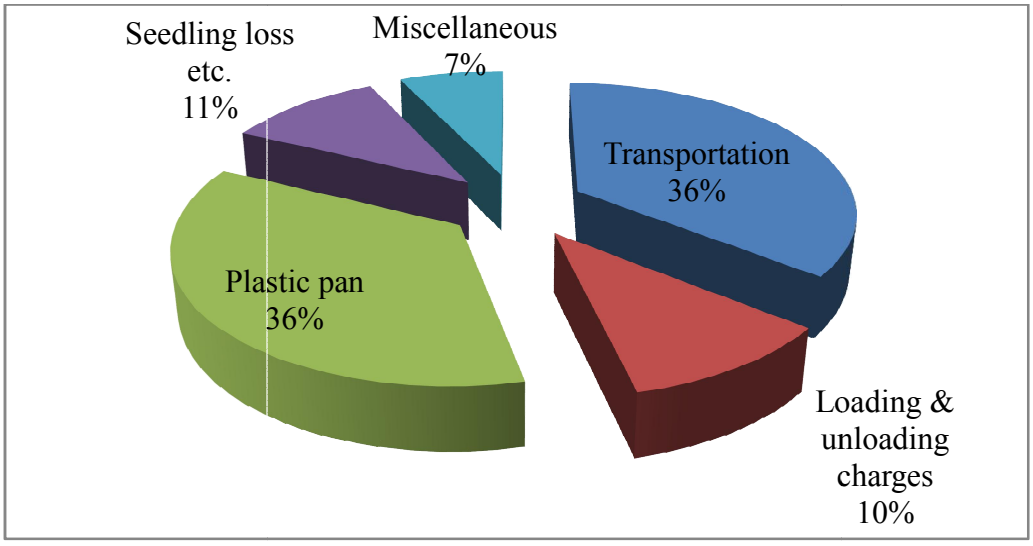


Fig.- 4.2 Marketing cost of tomato seedlings in channel - II (seedlings sold at other villages of same district) (type of nursery - open field)

4.2.4 Marketing cost of tomato seedlings in channel – I (seedlings sold at same village) (type of nursery - temporary shade net)

Marketing cost of tomato seedlings of temporary shade net type nursery in channel- I seedlings sold at same village was presented in table (4.14 and figure 4.3). It can be clearly seen from the table that the marketing cost of tomato seedlings i.e. from nursery raiser to crop grower of seedlings sold at same village was the highest marketing cost was observed in the packaging rake and plastic bucket 400₹. (53%) followed by transportation 300₹. (39%), loading and unloading charges 30₹. (4%), seedlings loss 10₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.14: Marketing cost of tomato seedlings of temporary shade net type nursery in channel – I (seedlings sold at same village)

Marketing cost of tomato seedlings incurred by crop grower of seedlings sold at same village in Rajnandgaon district (N = 10)		
Channel - I (Nursery Raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 50000 seedlings)**
1	Transportation	300 (39%)
2	Loading & unloading charges	30 (4%)
3	Packaging rake and plastic bucket	400 (53%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (3%)
	Total cost	**760**

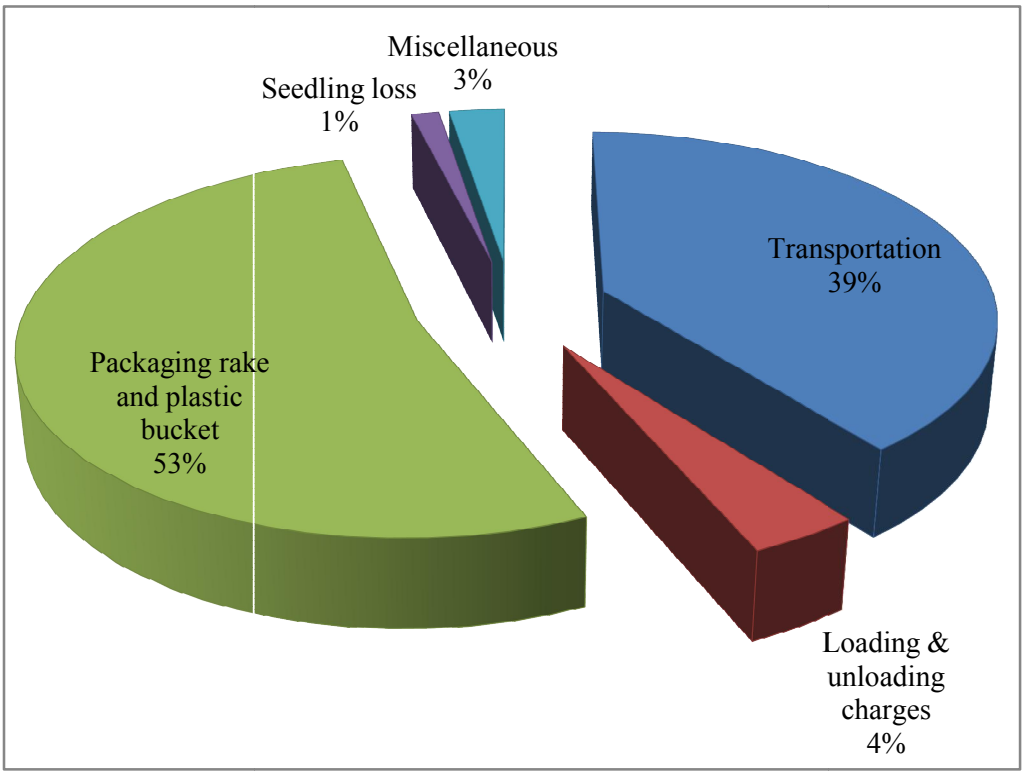


Fig.-4.3 Marketing cost of tomato seedlings in channel – I (seedlings sold at same village) (type of nursery – temporary shade net)

4.2.5 Marketing cost of tomato seedlings in channel – II (seedlings sold at other villages of same district) (type of nursery – temporary shade net)

Marketing cost of tomato seedlings of temporary shade net type nursery in channel- II seedlings sold at other villages of same district was presented in table (4.15 and figure 4.4). It can be clearly seen from the table that the marketing cost of tomato seedlings i.e. from nursery raiser to crop grower of seedlings sold at other villages of same district the highest marketing cost was observed in the packaging rake and plastic bucket 400 ₹.(47%) and transportation 400 ₹.(47%) followed by loading and unloading charges 30₹.(3%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.15: Marketing cost of tomato seedlings in channel – II (seedlings sold at other villages of same district) (type of nursery – temporary shade net)

Marketing cost of tomato seedlings incurred by crop grower of seedlings sold at other villages of same district (N = 8)		
Channel - II (Nursery raiser —› Crop grower)		
S.No.	**Particulars**	**Crop grower (₹. / 50000 seedlings)**
1	Transportation	400 (47%)
2	Loading & unloading charges	30 (3%)
3	Packaging rake and plastic bucket	400 (47%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (2%)
	Total cost	**860**

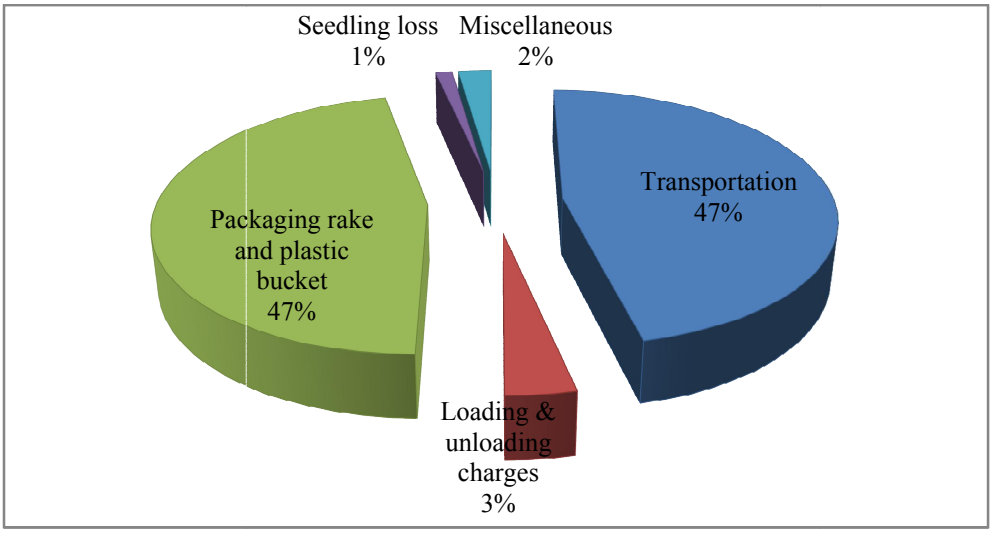


Fig.-4.4 Marketing cost of tomato seedlings in channel – II (seedlings sold at other villages of same district) (type of nursery - temporary shade net)

4.2.6 Marketing cost of tomato seedlings in channel – III (seedlings sold at other district) (type of nursery - temporary shade net)

Marketing cost of tomato seedlings of temporary shade net type Nursery in channel – III seedlings sold at other district was presented in table (4.16 and figure 4.5). It can be clearly seen from the table that the marketing cost of tomato seedlings i.e. from nursery raiser to crop grower of seedlings sold at other district the highest marketing cost was observed in the transportation 700 ₹.(59%) followed by packaging rake and plastic bucket 400 ₹. (34%), loading and unloading charges 40₹.(3%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.16: Marketing cost of tomato seedlings in channel - III (seedlings sold at other district) (type of nursery - temporary shade net)

Marketing cost of tomato seedlings incurred by crop grower of seedlings sold at other district (N = 5)		
Channel - III (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (Rs. / 50000 Seedlings)**
1	Transportation	700 (59%)
2	Loading & unloading charges	40 (3%)
3	Packaging rake and plastic bucket	400 (34%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	30 (3%)
	Total cost	**1180**

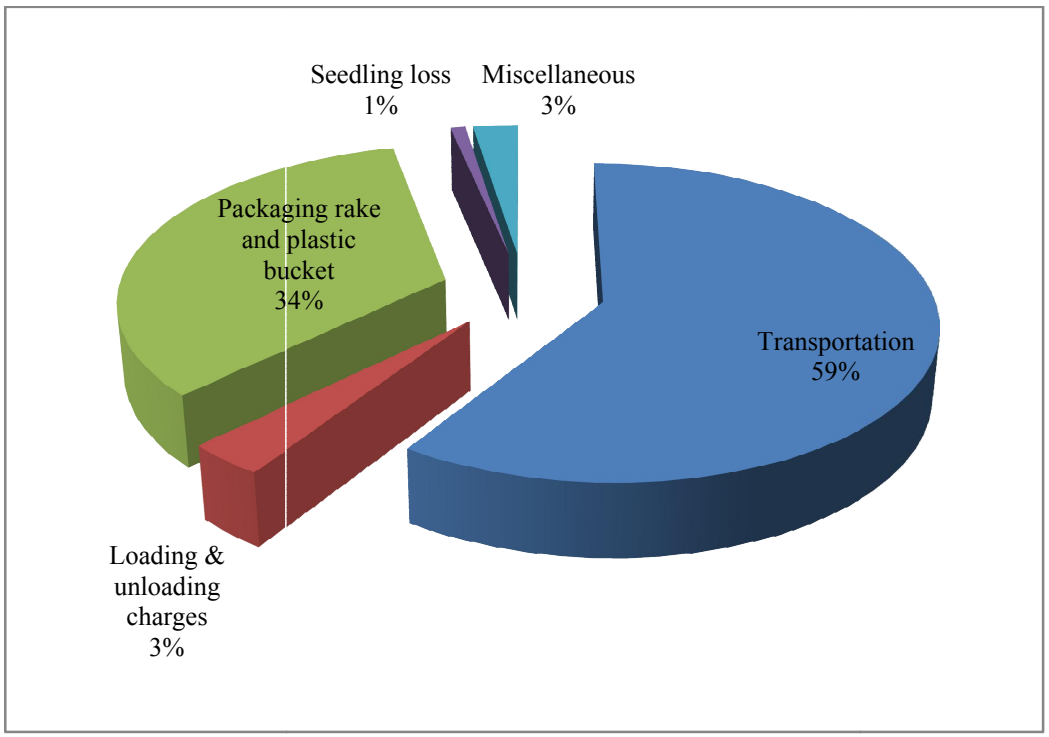


Fig.-4.5 Marketing cost of tomato seedlings in channel - III (seedlings sold at other district) (type of nursery – temporary shade net)

4.2.7 Marketing cost of chilli seedlings in channel – I (seedlings sold at same village) (type of nursery – open field)

Marketing cost of chilli seedlings open field in channel- I seedlings sold at same village was presented in table (4.17 and figure 4.6). It can be clearly seen from the table that the marketing cost of chilli seedlings i.e. from nursery raiser to crop grower of seedlings sold at same village the highest marketing cost was observed in the plastic pan 80₹. (42%) followed by transportation 50₹. (26%), loading and unloading charges 20₹.(11%), seedlings loss 20 ₹.(11%) and other charges. Marketing cost of 20000 seedlings has been calculated secure 20000 seedlings can be transported in one time.

Table 4.17: Marketing cost of chilli seedlings in channel – I (seedlings sold at same village)

Marketing cost of chilli seedlings incurred by Crop grower in Rajnandgaon district (N = 15)		
Channel - I (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 20000 seedlings)**
1	Transportation	50 (26%)
2	Loading & unloading charges	20 (11%)
3	Plastic pan	80 (42%)
4	Seedlings loss	20 (11%)
5	Miscellaneous	20 (11%)
	Total cost	**190**

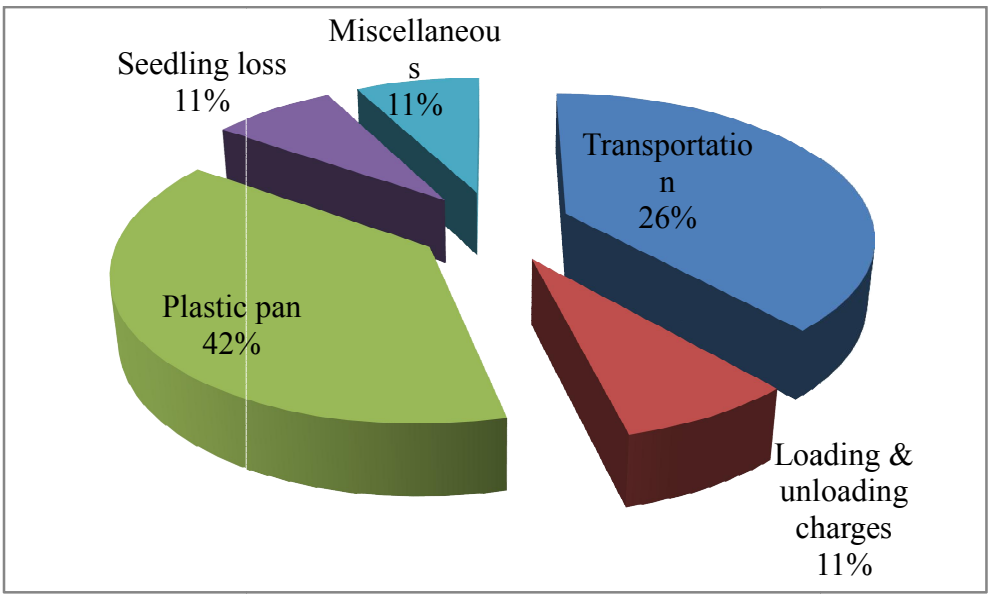


Fig.-4.6 Marketing cost of chilli seedlings in channel – I (seedlings sold at same village) (type of nursery – open field)

4.2.8 Marketing cost of chilli seedlings in channel – II (seedlings sold at other villages of same district) (type of nursery – open field)

Marketing cost of chilli seedlings open field in channel – II seedlings sold at other villages of same district was presented in table (4.18 and figure 4.7). It can be clearly seen from the table that the marketing cost of chilli seedlings i.e. from nursery raiser to crop grower of seedlings sold at other village of same district the highest marketing cost was observed in the transportation 150 ₹. (46%) followed by plastic pan 100 ₹.(30%), loading and unloading charges 30₹.(9%), seedlings loss 20 ₹.(6%) and other charges. Marketing cost of 20000 seedlings has been calculated secure 20000 seedlings can be transported in one time.

Table 4.18: Marketing cost of chilli seedlings in channel – II (seedlings sold at other villages of same district)

Marketing cost of chilli seedlings incurred by crop grower of seedlings sold at other villages of same district (N = 15)		
Channel - II (Nursery raiser —› Crop Grower)		
S. No.	**Particulars**	**Crop grower (₹. / 20000 seedlings)**
1	Transportation	150 (46%)
2	Loading & unloading charges	30 (9%)
3	Plastic pan	100 (30%)
4	Seedlings loss	20 (6%)
5	Miscellaneous	30 (9%)
	Total cost	**330**

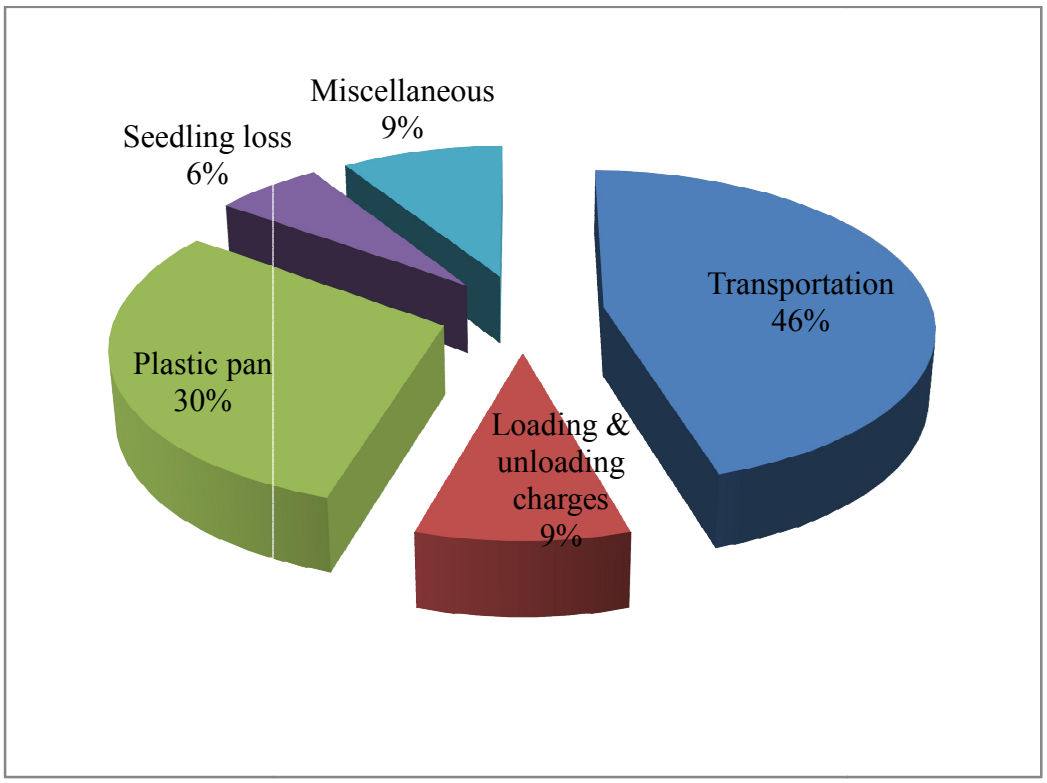


Fig.-4.7 Marketing cost of chilli seedlings in channel – II (seedlings sold at other villages of same district) (type of nursery – open field)

4.2.9 Marketing cost of chilli seedlings in channel – I (seedlings sold at same village) (type of nursery - temporary shade net)

Marketing cost of chilli seedlings of temporary shade net type nursery in channel- I seedlings sold at same village was presented in table (4.19 and figure 4.8). It can be clearly seen from the table that the marketing cost of chilli seedlings i.e. from nursery raiser to crop grower of seedlings sold at same village the highest marketing cost was observed in the packaging rake and plastic bucket 400 ₹. (53%) followed by transportation 300 ₹.(39%), loading and unloading charges 30₹.(4%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.19: Marketing cost of chilli seedlings in channel – I (seedlings sold at same village) (type of nursery - temporary shade net)

Marketing cost of chilli seedlings incurred by crop grower in Rajnandgaon district (N = 10)		
Channel-1 (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 50000 seedlings)**
1	Transportation	300 (39%)
2	Loading & unloading charges	30 (4%)
3	Packaging rake and plastic bucket	400 (53%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (3%)
	Total cost	**760**

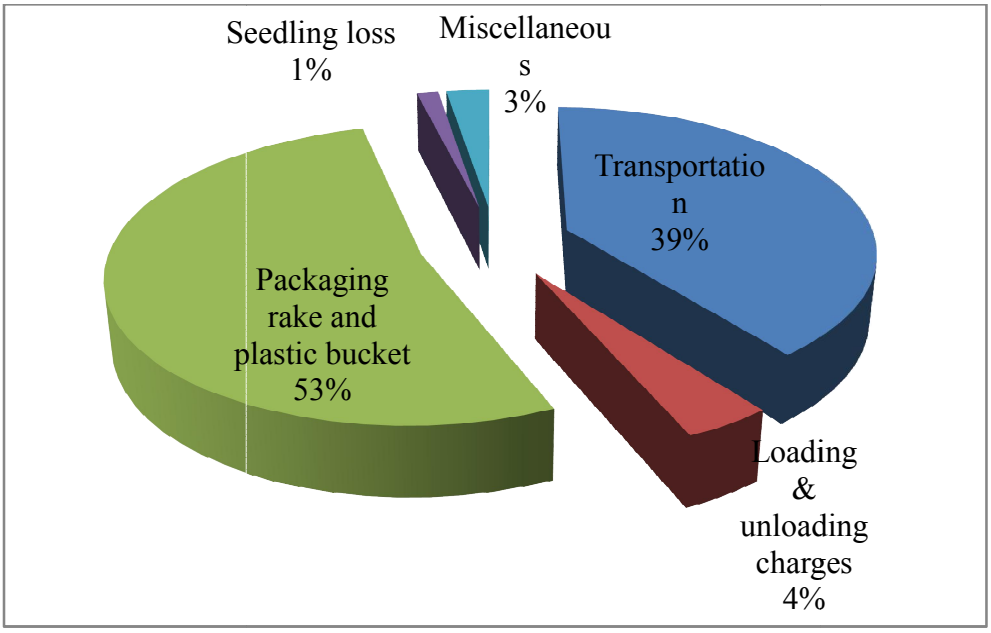


Fig.-4.8 Marketing cost of chilli seedlings in channel – I (seedlings sold at same village) (type of nursery - temporary shade net)

4.2.10 Marketing cost of chilli seedlings in channel - II (seedlings sold at other villages of same district) (Type of nursery-temporary shade net)

Marketing cost of chilli seedlings of temporary shade net type nursery in channel- II seedlings sold at other village of same district was presented in table (4.20 and figure 4.9). It can be clearly seen from the table that the marketing cost of chilli seedlings i.e. from nursery raiser to crop grower of seedlings sold at other village of same district the highest marketing cost was observed in the packaging rake and plastic bucket 400 ₹.(46%) and transportation 400 ₹. (46%) followed by loading and unloading charges 40₹.(5%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.20: Marketing cost of chilli seedlings in channel - II (seedlings sold at other village of same district) (type of nursery-temporary shade net)

Marketing cost of chilli seedlings incurred by crop grower of seedlings sold at other village of same district (N = 5)		
Channel – II (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 50000 seedlings)**
1	Transportation	400 (46%)
2	Loading & unloading charges	40 (5%)
3	Packaging rake and plastic bucket	400 (46%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (2%)
	Total cost	**870**

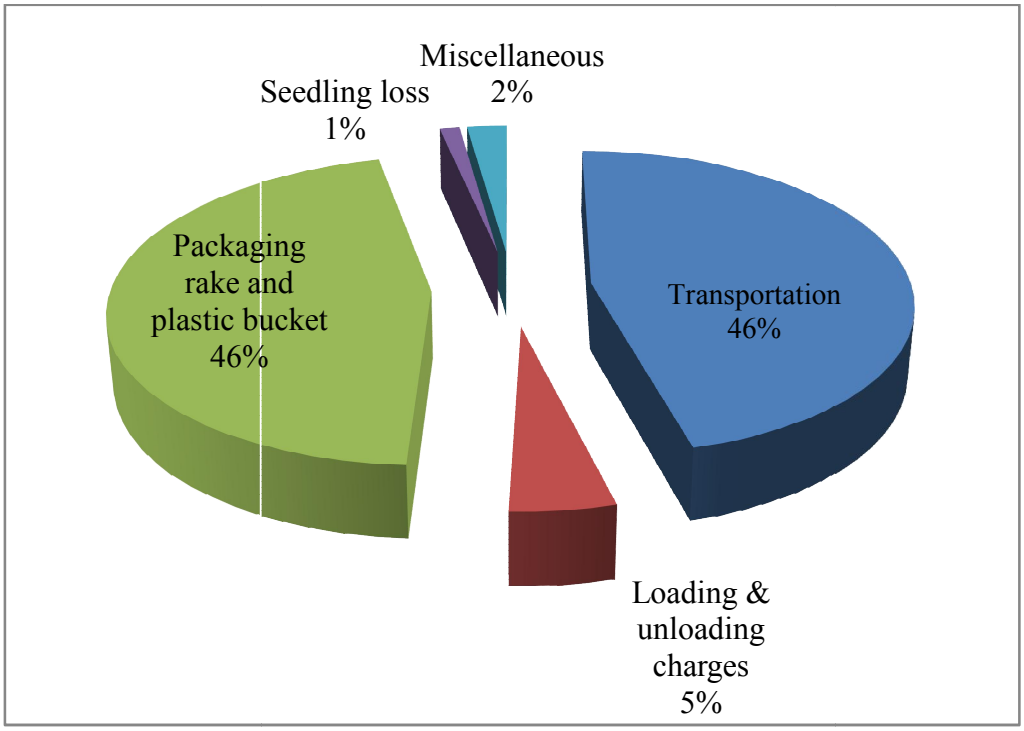


Fig.-4.9 Marketing cost of chilli seedlings in channel - II (seedlings sold at other village of same district) (type of nursery – temporary shade net)

4.2.11 Marketing cost of chilli seedlings in channel – III (seedlings sold at other district) (type of nursery - temporary shade net)

Marketing cost of chilli seedlings of temporary shade net type nursery in channel- III seedlings sold at other district was presented in table (4.21 and figure 4.10). It can be clearly seen from the table that the marketing cost of chilli seedlings i.e. from nursery raiser to crop grower of seedlings sold at other district the highest marketing cost was observed in the transportation 800 ₹. (63%) followed by packaging rake and plastic bucket 400 ₹.(31%), loading and unloading charges 40₹.(3%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 50000 seedlings has been calculated secure 50000 seedlings can be transported in one time.

Table 4.21: Marketing cost of chilli seedlings in channel – III (seedlings sold at other district) (type of nursery - temporary shade net)

Marketing cost of chilli seedlings incurred by crop grower of seedlings sold at other district (N = 10)		
Channel - III (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹./ 50000 seedlings)**
1	Transportation	800 (63%)
2	Loading & unloading charges	40 (3%)
3	Packaging rake and plastic bucket	400 (31%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (2%)
	Total cost	**1270**

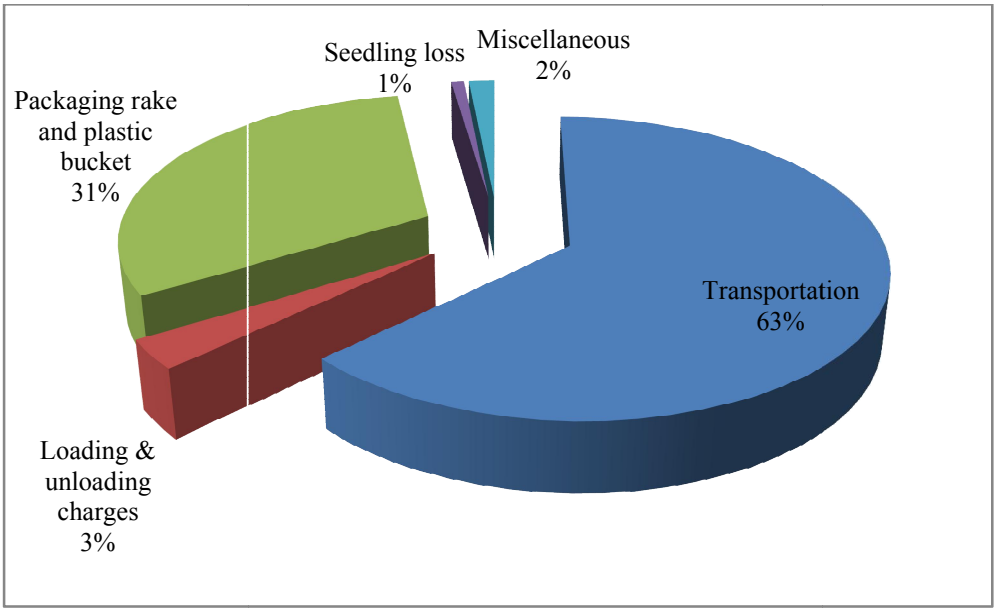


Fig.-4.10 Marketing cost of chilli seedlings in channel – III (seedlings sold at other district) (type of nursery – temporary shade net)

4.2.12 Marketing cost of papaya seedlings in channel – I (seedlings sold at same village) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings of temporary shade net type nursery in channel - I seedlings sold at same village was presented in table (4.22 and figure 4.11). It can be clearly seen from the table that the marketing cost of papaya seedlings i.e. from nursery raiser to crop grower of seedlings sold at same village the highest marketing cost was observed in the transportation 300 ₹.(45%) and packaging rake 300 ₹. (45%) followed by loading and unloading charges 30₹.(5%), seedlings loss 10 ₹.(2%) and other charges. Marketing cost of 12000 seedlings has been calculated secure 12000 seedlings can be transported in one time.

Table 4.22: Marketing cost of papaya seedlings in channel – I (seedlings sold at same village) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings incurred by crop grower in Rajnandgaon district (N = 10)		
Channel - I (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 12000 seedlings)**
1	Transportation	300 (45%)
2	Loading & unloading charges	30 (5%)
3	Packaging rake	300 (45%)
4	Seedlings loss	10 (2%)
5	Miscellaneous	20 (3%)
	Total cost	**660**

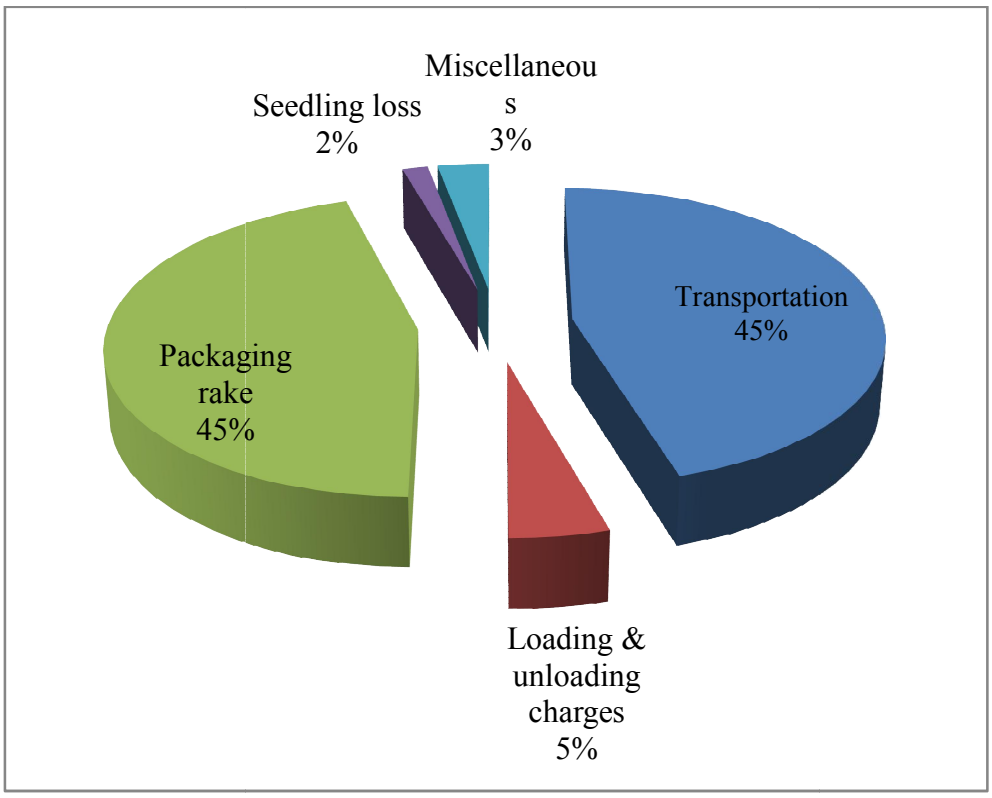


Fig.-4.11 Marketing cost of papaya seedlings in channel – I (seedlings sold at same village) (type of nursery - temporary shade net)

4.2.13 Marketing cost of papaya seedlings in channel – II (seedlings sold at other village of same district) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings of temporary shade net type nursery in channel – II seedlings sold at other village of same district was presented in table (4.23 and figure 4.12) . It can be clearly seen from the table that the marketing cost of papaya seedlings i.e. from nursery raiser to crop grower of seedlings sold at other village of same district the highest marketing cost was observed in the transportation 700 ₹. (65%) followed by packaging rake 300 ₹.(28%), loading and unloading charges 40₹.(4%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 12000 seedlings has been calculated secure 12000 seedlings can be transported in one time.

Table 4.23: Marketing cost of papaya seedlings in channel – II (seedlings sold at other village of same district) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings incurred by crop grower of seedlings sold at other village of same district (N = 20)		
Channel - II (Nursery raiser —› Crop Grower)		
S. No.	**Particulars**	**Crop grower (₹./ 12000 seedlings)**
1	Transportation	700 (65%)
2	Loading & unloading charges	40 (4%)
3	Packaging rake	300 (28%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (2%)
	Total cost	**1070**

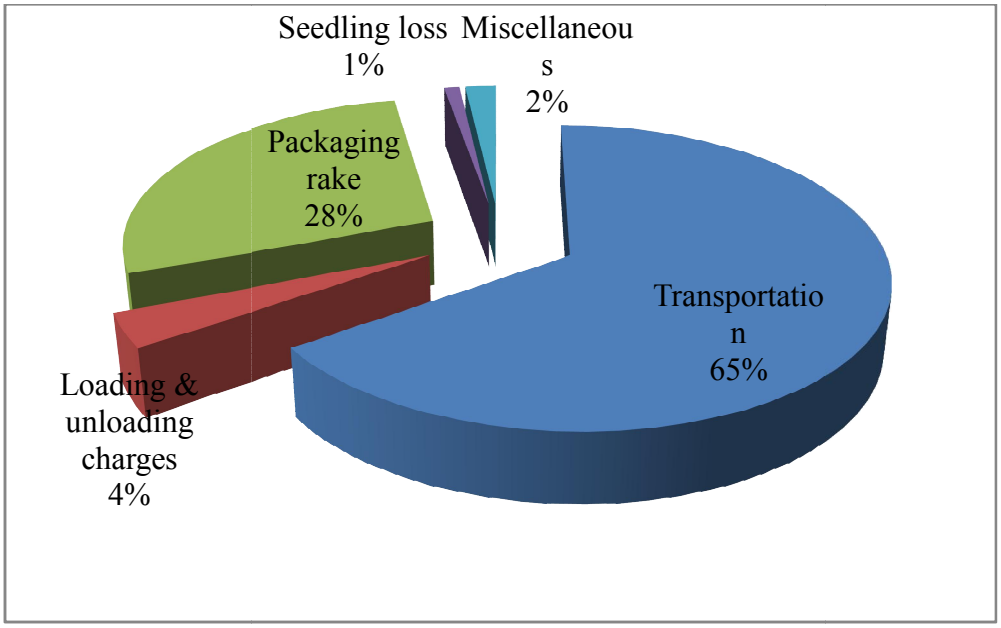


Fig.-4.12 Marketing cost of papaya seedlings in channel – II (seedlings sold at other village of same district) (type of nursery – temporary shade net)

4.2.14 Marketing cost of papaya seedlings in channel – III (seedlings sold at other district) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings of temporary shade net type nursery in channel - III seedlings sold at other district was presented in table (4.24 and figure 4.13). It can be clearly seen from the table that the marketing cost of papaya seedlings i.e. from nursery raiser to crop grower of seedlings sold at other district the highest marketing cost was observed in the transportation 1000 ₹. (73%) followed by packaging rake 300 ₹.(22%), loading and unloading charges 40₹.(4%), seedlings loss 10 ₹.(1%) and other charges. Marketing cost of 12000 seedlings has been calculated secure 12000 seedlings can be transported in one time.

Table 4.24: Marketing cost of papaya seedlings in channel – III (seedlings sold at other district) (type of nursery – temporary shade net)

Marketing cost of papaya seedlings incurred by crop grower of seedlings sold at other district (N = 8)		
Channel - III (Nursery raiser —› Crop Grower)		
S.No.	**Particulars**	**Crop grower (₹. / 12000 Plant)**
1	Transportation	1000 (73%)
2	Loading & unloading charges	40 (3%)
3	Packaging rake	300 (22%)
4	Seedlings loss	10 (1%)
5	Miscellaneous	20 (1%)
	Total cost	**1370**

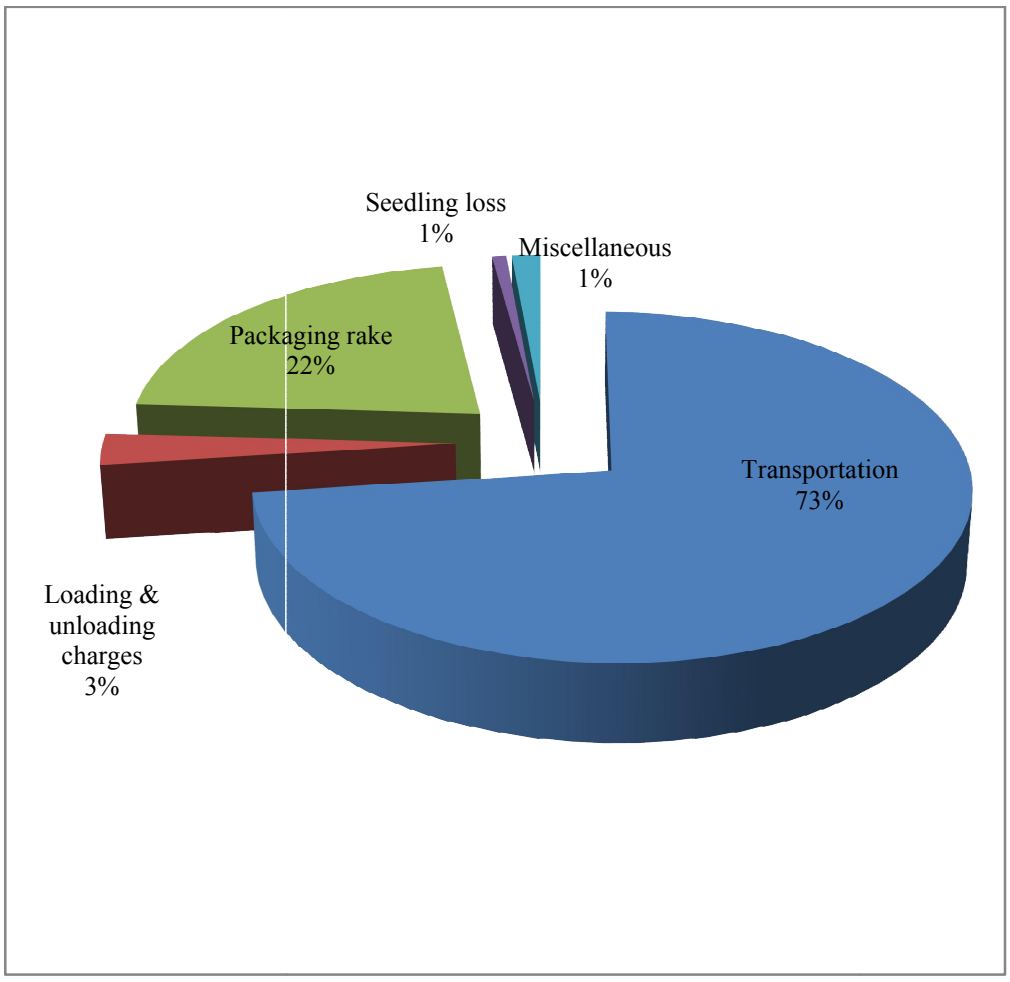


Fig.-4.13 Marketing cost of papaya seedlings in channel – III (seedlings sold at other district) (type of nursery – temporary shade net)

Note:- It is observed that the marketing channel for tomato, chilli and papaya seedlings was direct channel, hence, the marketing margin and marketing efficiency cannot be calculated.

4.3 To find out the constraints in nursery raising of selected horticultural crops and suggest suitable measures to overcome them

4.3.1 Constraints faced by tomato seedlings nursery raiser

No. of constraints faced by nursery raiser are listed in (table 4.25 and figure 4.14) and it was ranked by nursery raiser result shows ranked first, high price of seed (71%) fallowed by problems of drainage system (49%) and problems of marketing (49%) while carefully and time consumption in uprooting (34%) was observed least constraints by nursery raiser.

Table 4.25: Constraints faced by tomato seedlings nursery raiser

S. No.	Particulars	Total score	Rank	Percentage
1	High price of seed	3585	1	71
2	Problems of drainage system	2473	2	49
3	Problems of marketing	2455	3	49
4	Inadequacy of labour availability	2288	4	45
5	Occurrence of insect pest	2116	5	42
6	Occurrence of diseases	2091	6	41
7	Inadequacy of technical knowledge of nursery raiser	2058	7	41
8	Carefully and time consumption in uprooting	1748	8	34

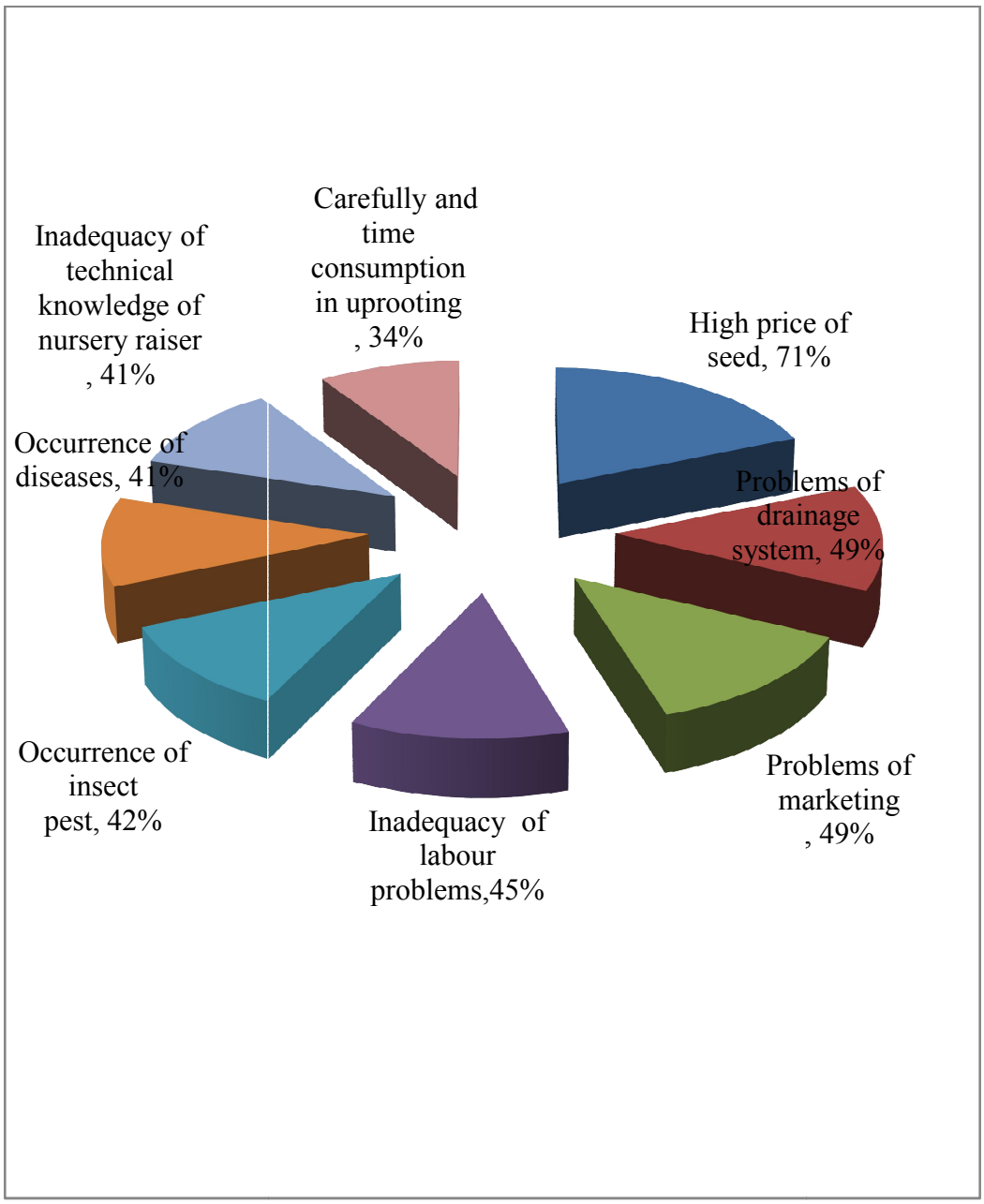


Fig. – 4.14 Constraints faced by tomato seedlings nursery raiser

4.3.2 Constraints faced by chilli seedlings nursery raiser

Various constraints was faced by nursery raiser was listed in (table 4.26 and figure 4.15) total 8 constraints was faced by chilli Nursery raiser is study area these constraints were ranked them with high price of seed (73%) first ranked, problems of drainage system (55%) was second ranked and third rank is problems of marketing (53%) while inadequacy of technical knowledge of nursery raiser (36%) and carefully and time consumption in uprooting (34%) was least ranked.

Table 4.26: Constraints faced by chilli seedlings nursery raiser

S. No.	Particulars	Total score	Rank	Percentage
1	High price of seed	3585	1	73
2	Problems of drainage system	2773	2	55
3	Problems of marketing	2655	3	53
4	Inadequacy of labour availability	2450	4	49
5	Occurrence of insect pest	2270	5	45
6	Occurrence of diseases	2100	6	42
7	Inadequacy of technical knowledge of nursery raiser	1842	7	36
8	Carefully and time consumption in uprooting	1748	8	34

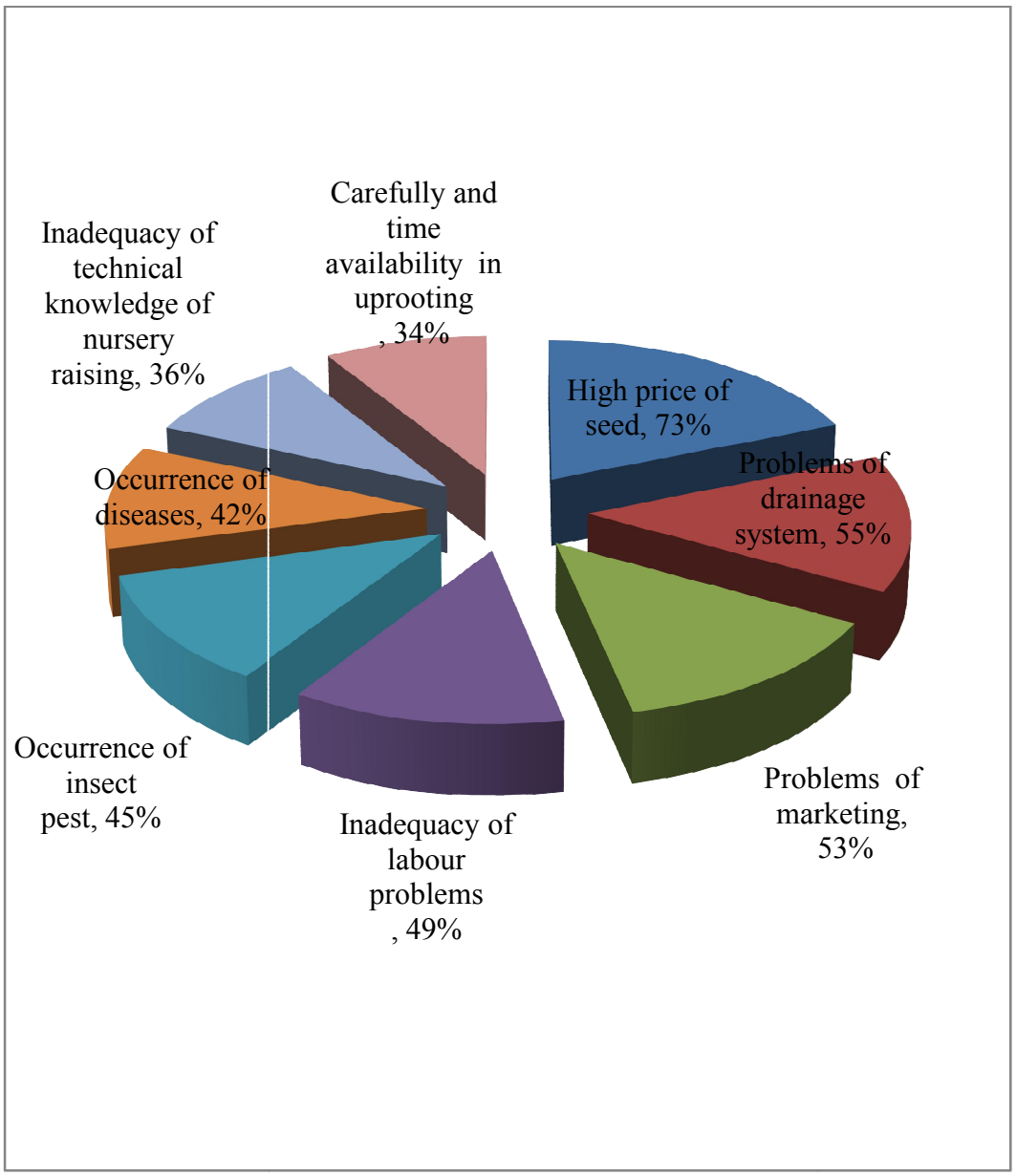


Fig. – 4.15 Constraints faced by chilli seedlings nursery raiser

4.3.3 Constraints faced by papaya seedlings nursery raiser

No. of constraints faced by nursery raiser are listed in (table 4.27 and figure 4.16) and it was ranked by nursery raiser result shows ranked first, problems of marketing (70%) followed by high price of seed (70%) and problems of drainage system (63%) while inadequacy of capital (23%) was observed least constraints by nursery raiser.

Table 4.27: Constraints faced by papaya seedlings nursery raiser

S. No.	Particulars	Total score	Rank	Percentage
1	Problems of marketing	2112	1	70
2	High price of seed	2100	2	70
3	Problems of drainage system	1910	3	63
4	Inadequacy of labour availability	1752	4	59
5	Inadequacy technical knowledge of nursery raising	1486	5	49
6	Occurrence of diseases	1290	6	43
7	Climate uncertainty	864	7	28
8	Inadequacy of capital	696	8	23

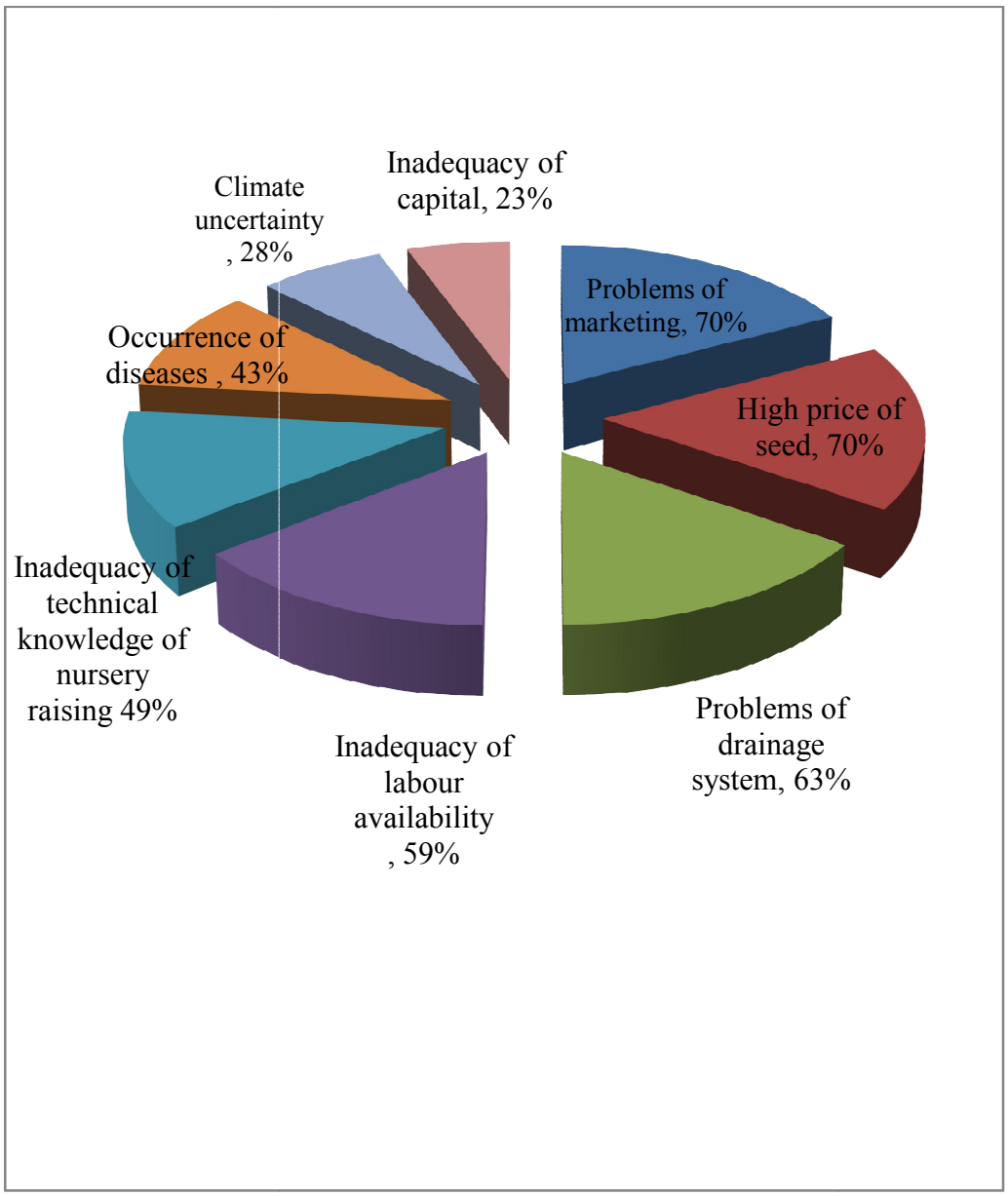


Fig. – 4.16 Constraints faced by papaya seedlings nursery raiser

4.3.4 Suitable measures for overcoming the constraints faced by tomato, chilli and papaya nursery raiser

It was observed the constraints faced by tomato and chilli nursery raiser in study area were same. These constraints can be overcome up to some extant if proper measures and strategy are taken. Governments should provide subsidies to nursery raiser in order to overcome the high price of seed. Timely training programme should be conducted by government horticulture departments and other organization to nursery raiser. So that, their technical skill can be improved. Similarly the shortage of labour can be minimize by introducing labour replacing machine nursery raising. Proper disposal centre for marketing of seedlings should be constructed at potential market like Rajnandgaon sabji mandi (APMC) so that cultivator can be easily purchase the seedlings from there and marketing of seedlings can be secure. To prevent losses of seedlings which was caused by insect-pest and diseases seed and nursery bed should be properly treated and timely sowing of seeds is also encouraged. Proper drainage system should be maintained in the nursery in order to reduced the mortality of the seedlings which in turn will generate more profit to nursery raising.

Some constraints were faced by papaya nursery raiser except the problem of climate uncertainty and inadequacy of capital which can be overcome by using the green house for nursery raising similarly by adopting the timely sowing and irrigation practices, loss from climate uncertainty can be reduced. Inadequacy of capital in nursery raising can be fulfil by approaching the financial institution like co-operative bank for the financial support to meet their requirements. Adequate availability of capital will help the nursery raiser to carry out nursery raising business effective and profitably.

CHAPTER - V

SUMMARY AND CONCLUSIONS

5.1 Summary

A nursery is a managed site, designed to produce seedlings grown under favourable condition until they are ready for planting. All nurseries primarily aim to produce sufficient quantities of high quality seedlings to satisfy the needs of users. Plant propagation techniques and practices are the core of horticulture nurseries. Product from nursery which is used for cultivation is known in different terms *viz;* seedlings, planting material, plantlets *etc*.

Keeping in the above views the present study will be undertaken in Rajnandgaon district with following objectives.

1. To work out the cost benefit analysis of the nursery raising of selected horticultural crops.
2. To estimate the marketing cost, marketing margin and efficiency in marketing of planting material of selected horticultural crops.
3. To find out the constraints in nursery raising of selected horticultural crops and suggest suitable measures to overcome them.

Out of 27 districts of Chhattisgarh, Rajnandgaon district was selected purposively. Rajnandgaon district has 9 blocks namely- Chhuikhadan, Khairagarh, Dongargarh, Rajnandgaon, Dongargaon, Chhuriya, Mohla, Manpur and Ambagarh Chowki.

Only two flowers *viz*; marigold and gladiolus are cultivated in Rajnandgaon district and planting materials of these flowers are supplied by other districts and states, there is no nursery for flower in study area. So, one crop from vegetables, fruits and spices has been taken for study on the basis of highest sold out planting material in district during last 5 years.

The selection of planting material sellers of horticultural crops in the block will also be considered for calculating the marketing cost of seedlings. Nurseries of Rajnandgaon district has been undertaken for vegetable, fruit and spices seedlings for accomplishing the objectives of study.

5.2 Conclusion

1. The profitability in tomato seedlings was estimated it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of tomato seedlings in open field was profitable.
2. The profitability in tomato seedlings was estimated it was found that input-output ratio was 1:2.97 while benefit-cost ratio was 1:1.97 respectively, indicating that raising of tomato seedlings in temporary shade net was more profitability than open field nursery.
3. The profitability in chilli seedlings was estimated it was found that input-output ratio was 1:2.08 while benefit-cost ratio was 1:1.08 respectively, indicating that raising of chilli seedlings in open field was profitable.
4. The profitability in chilli seedlings was estimated it was found that input-output ratio was 1:3.10 while benefit-cost ratio was 1:2.10 respectively, indicating that raising of chilli seedlings in temporary shade net was profitability than open field nursery.
5. The profitability in papaya seedlings was estimated it was found that input-output ratio was 1:3.92 while benefit-cost ratio was 1:2.92 respectively, indicating that raising of papaya seedlings in temporary shade net was profitable.
6. It was observed that in the study area there, were three types of marketing channel for seedlings of tomato, chilli and papaya was found.
7. Marketing cost of tomato seedlings in channel – I i.e. from nursery raiser to crop grower of seedlings sold at same village was 210₹.

8. Marketing cost of chilli seedlings of temporary shade net type nursery in channel – I i.e. from nursery raiser to crop grower of seedlings sold at same village was 760₹.
9. Marketing cost of papaya seedlings of temporary shade net type nursery in channel – III i.e. from nursery raiser to crop grower of seedling sold at other district was 1370₹.
10. Governments should provide subsidies to nursery raiser in order to overcome the high price of seed.
11. Timely training programme should be conducted by government horticulture departments and other organization to nursery raiser. So that, their technical skill can be improved.
12. The shortage of labour can be minimize by introducing labour replacing machine nursery raising.
13. Proper disposal centre for marketing of seedlings should be constructed at potential market like Rajnandgaon sabji mandi (APMC) so that cultivator can be easily purchase the seedlings from there and marketing of seedlings can be secure.
14. To prevent losses of seedlings which was caused by insect-pest and diseases seed and nursery bed should be properly treated and timely sowing of seeds is also encouraged.
15. Proper drainage system should be maintained in the nursery in order to reduced the mortality of the seedlings which in turn will generate more profit to nursery raising.
16. Using the green house for nursery raising similarly by adopting the timely sowing and irrigation practices, loss from climate uncertainty can be reduced.
17. Inadequacy of capital in nursery raising can be fulfil by approaching the financial institution like co-operative bank for the financial support to meet their requirements.

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APPENDIX- A

DEPARTMENT OF AGRICULTURAL ECONOMICS

INDIRA GANDHI AGRICULTURE UNIVERSITY

RAIPUR (CHHATTISGARH)

"A STUDY ON COST-BENEFIT ANALYSIS OF NURSERY RAISING OF SELECTED HORTICULTURAL CROPS IN RAJNANDGAON DISTRICT OFCHHATTISGARH"

Investigator – Bhupendra Kumar

Major Advisor - Dr. Sushila

Nursery Raiser Farmer Schedule

A. General information

1. Name of respondent …….. 2. Age ……

3. Education …… …. 4. Caste (Gen./SC/ST/OBC)……..,.

5. Village …… … 6. Post ……..

7. Tehsil …….. 8. District ……...

9. State …….. 10. Distance from market (km) ……

11. Distance from pacca road (km) …….. 2. Date of interview …….

13.Occupation -1.Main …….. 2.Subsidiary …….

B. Details of the family

S. N.	Name of family members	Relation to head	Sex	Age
Total				

* 1= illiterate, 2 = Primary, 3 = Middle school, 4 = High School, 5= Higher Secondary, 6 = Graduate , 7 = Post Graduate

C. Details of land holding

Land

Particular	Area(ha)	Irrigation	
		Irrigated	Un-irrigated
Owned land *i.* Cultivated ii.Homestead • Leased in • Leased out			
Total land			

Source of Irrigation

S.NO.	Particular	Area(ha)	Irrigation charges(Rs.)
1 2 3 4 5 6	Tank Canal Tube well Bore well Stop dam Other		

D. Cropping pattern

Season	Crops	Variety	Area (ha.)		Production (quintal)	Value Rs./Qtl.
			Irrigated	Un-irrigated		
Kharif	a. b. c. d. e. f. g. h.					
Total Kharif						

Rabi	a. b. c. d. e. f. g. h.					
Total Rabi						

Cost of cultivation

Crop …… Variety …….

Area ……..…… (Irrigated / Urinated)

(A) Input cost ofnursery raiser

S.N.	Input	Quantity	Rate(Rs) / unit	Total value (Rs.)
1	Seed			
2	Seed treatment			
3	FYM			
4	Fertilizers a. b. c. d.			
5	Micronutrients and growth hormones a. b.			
6	Plant protection chemicals a.			

	b. c. d.			
7	Weedicides a. b.			
8	Irrigation charges a. b. c.			
9	Agricultural implements a. b. c. d. e. f.			
Total				

(B)Labour cost ofNursery Raiser

S. No.	Operation	Family human labour(days)			Hired human labour(days)			Bullock power			Total expenditure on particular operation
		M	F	T	M	F	T	O	H	R	
1	Field preparation/ Seedling tray filling										
2	Application of manures & fertilizer										
3	Sowing / Transplanting										
4	Interculture										
5	Irrigation										

6	Plant protection										
7	Uprooting										
8	Miscellaneous										
	Total										

M = Male, F= Female, T = Total,O = Family labour, H= Hired labour,

Rate Hired Labour, =Female Rs……./day , Male Rs……./Day

(C) Interest on working capital ----------

(D) Fixed cost

a) Rental value of land / leased in land (Rs.): ……

b) Land revenue (Rs.) :…….

(E) Marketing cost

1. Name of crop ……

2. Quantity in each month sold (quintal) ……

3. To whom sold ……..

4. Selling place ……..

5. Price (Rs. /Qts.) ……

6. Distance to marketing place ……

7. Means of transportation a) Tractor b) Truck c) Bullock cart d) Other

8. Transportation charge (Rs.) ……

9. Loading/unloading charge ……

10. Commission charge (Rs.) …… Miscellaneous ……

11. Packaging cost (Rs./q) …….

12. Bagging……

13. Total marketing cost (Rs./Qts) …….

Tomat/ Chilli/ Papaya	Sale price of seedlings (Rs. / seedling)	Actual price of seedlings received (Rs. / seedling)	Total Marketing Charges (Rs./ seedling)

(F)Constraints faced byNursery Raiser in Tomato / Chilli / Papaya seedlings:

a. …….

b. …….

c. …….

d. …….

e. …….

f. …….

APPENDIX- B

Name of sampled nursery raiser

Rajnandgaon block		**Dongargarh block**	
S.No.	**Nursery Raiser**	**S.No.**	**Nursery Raiser**
1	Ramdassahu	1	GopalVerma
2	Kesave	2	DelipSahu
3	Ram singh	3	BalaramSahu
4	Mohit Thakur	4	OmkarPrashad
5	Ashok Patel	5	Raja Ram Patel
6	Jaleshwarsingh Patel	6	Manohar Patel
7	TamradhwajJanghel	7	LallaSahu
8	Thakur ram	8	LaxmanVarma
9	Hieshwar Patel	9	KishanJanghel
10	Dharmraj Patel	10	PuneetSahu
11	Lakhan Patel	11	RekhLalVerma

12	Durli Chandra	12	ShasikantYadav
13	Jayat Ram Verma	13	Raju ram
14	LeelaramVerma	14	ArvindBagmare
15	Ramesh Chandel	15	Dinesh Sahu
17	YogeshSoni	17	Vijay Ramteke
18	UttamSahu	18	ShayamLal
19	VasuVerma	19	Anant Ram
20	Bud Ram	20	Tirpal
21	NetramSahu	21	LaxmikantSahu
22	LallaSahu	22	Bihari Patel
23	Khemchandra Verma	23	KanhaiyaLalSahu
24	DularDau Patel	24	Malkhan Patel
25	RatanSahu	25	SukhcharanVerma
26	ShasikantYadav	26	Baldev Patel

27	KishanJanghel	27	GirdharRana
28	RekhaLalVerma	28	Lakhan Patel
29	KishanNishad	29	SalikSahu
30	RavindraJanghel	30	Ashok Patel
31	DommaNishad	31	BhaktiyaramVerma
32	HadmoramKashyap	32	GaganChandrakar
33	KailashSahu	33	Surendrapatel
34	BalwantBaghel	34	Ganesh patel
35	BbihariSahu	35	DayaramSatnami
36	RameshwarSahu	36	Dharm Das
37	LakhanLalKevat	37	Shankar Patel
38	RadheshyamSahu	38	Ganga Ram
39	ManharanKevat	39	Shampat Patel
40	Bharat LalSahu	40	MundiyaSahu

41	GhanshyamSahu	41	Dhaniram
42	Dilip Patel	42	Mangal
43	DamruSahu	43	KalicharanKashyap
44	Anant Ram	44	BhagwaliSahu
45	DayaluSatnami	45	Dukhiram Patel
46	Lalhu Das	46	DashrathLalSahu
47	Kartik	47	ShayamBhawKevat
48	VikramKevat	48	VishawnathSuryawanshi
49	Dayaram	49	Ramkhelawan Patel
50	Ramchandra	50	Daya Ram
51	Sonu Ram	51	DherruSahu
52	RiteshRangari	52	Rajesh Sahu
53	TekramVedrma	53	RajaRam
54	Anil	54	ChandanVerma

55	Pandit Ram	55	BhupendraSahu
56	Amin	56	Horilal
57	PareshSahu	57	MheshSahu
58	RajendraRamteke	58	Kunal
59	Manoj	59	Jaswant
60	Kishor	60	NarendraSahu

VITA

Name	:	**Bhupendra Kumar**
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Academic qualifications:-

Examination	Year of Passing	Division	Percentage/ OGPA	Board/ University	Major Subject
Higher Secondary Certificate	2011	2nd	58 per cent	CGBSE Raipur (CG)	Biology
B.Sc. (Hort.)	2016	1st	7.17/10 (OGPA)	I.G.K.V. Raipur (C.G.)	Horticulture
M.Sc. (Ag.)	-	-	Appearing	I.G.K.V. Raipur (C.G.)	Agricultural Economics

Signature

Bhupendra Kumar

Gmail Bhupendra Kadve <kadve71@gmail.com>

Acceptence letter reg..!

2 messages

Kariyanna B Desai <kariyannabento@gmail.com> Fri, Nov 9, 2018 at 10:08 AM
To: leelesh sahu <leeleshsahu89@gmail.com>, kadve71@gmail.com

National Conference
On
Promotion and Reinvogorsating Agri-Horti innovation technology (PRAGATHI-2018)
DISHA-2018, 15-16th December , 2018
Jasmine Hall, Clarion Bella Cassa, Jaipur

Bhupendra Kumar[1] and Dr. Sushila [2]

Dear Sir/Madam,

We are pleased to inform that Organizing committee, PRAGTHI-2018, has accepted your full length paper entitled "**COST BENEFIT ANALYSIS OF TOMATO NURSERY RAISING**" . authored **Bhupendra Kumar[1] and Dr. Sushila [2]** . The same after due checking of plagiarism and other issues will be sent for publication in the research Journal **Bulletin of Environment, Pharmacology and Life Sciences** (UGC indexed) having NAAS Rating of 4.95 and the PDF copy online can be accessed or retrieved from the website / links to be provided later on and will be intimated to you on or before 15, December, 2018. These terms are mandatory to follow for the journal publication. your remittance of full length paper charges of Rs 3000/-paper. The fees can be paid in advance through Cash/DD/CBS check in favour of S&TSIRI Voluntary Organization, payable at Thorrur Warangal. (In case of Online submission, the same can be sent in the society account name S&T SIRI Voluntary Organization, Bank Name- State Bank of Hyderabad, Account No.52149863451,IFSC Code: SBHY0020246, MICR Code506004702, Branch address Thorrur,Dist.Warangal, State: Telangana) with an information to Shri Edunari Srinivas,President,S&T SIRI Voluntary Organization. Do not forget to collect your receipt of the payment made from the registration desk or from the organizers.
Awaiting for a positive reply in this regard With warm regards,

Yours sincerely
Shri Edunuri Srinivas, President, S& T SIRI e-mail: siri.ngo.trr@gmail.com & srisrinu.e@gmail.com Cell No-9948170538

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With regards
Kariyanna B.
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Mob.: +91 9902233983
Book: *https://www.morebooks.shop/store/gb/book/longhorn-beetles-coleoptera-of-agricultural-importance-from-india/isbn/978-613-7-05497-0*
Monograph: *https://biotaxa.org/Zootaxa/article/view/zootaxa.4345.1.1*
Website Database: *nbair.res.in/Cerambycidae/index.html*

"Eternal Nature**(Earth)**: Grow **Tree, Save** Water"

leelesh sahu <leeleshsahu89@gmail.com> Fri, Nov 9, 2018 at 5:56 PM
To: Bhupendra Kadve <kadve71@gmail.com>

Le aa gya tera acceptance
Isko print kra ke thesis ke sath lga le
[Quoted text hidden]